RADIOLOGY NUMBER

THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION

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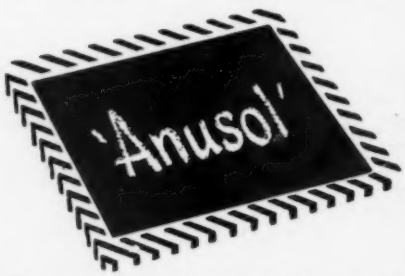

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Published monthly by the American Osteopathic Association. Office of Publication, 100 S. Kenilworth Ave., Oak Park, Ill. Address all communications to the Main Office at 139 North Clark St., Chicago 2, Ill. Subscriptions $10 a year. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized August 31, 1922. Entered at the Oak Park, Ill., post office as second class matter, April 1, 1926, under the Act of March 3, 1879.

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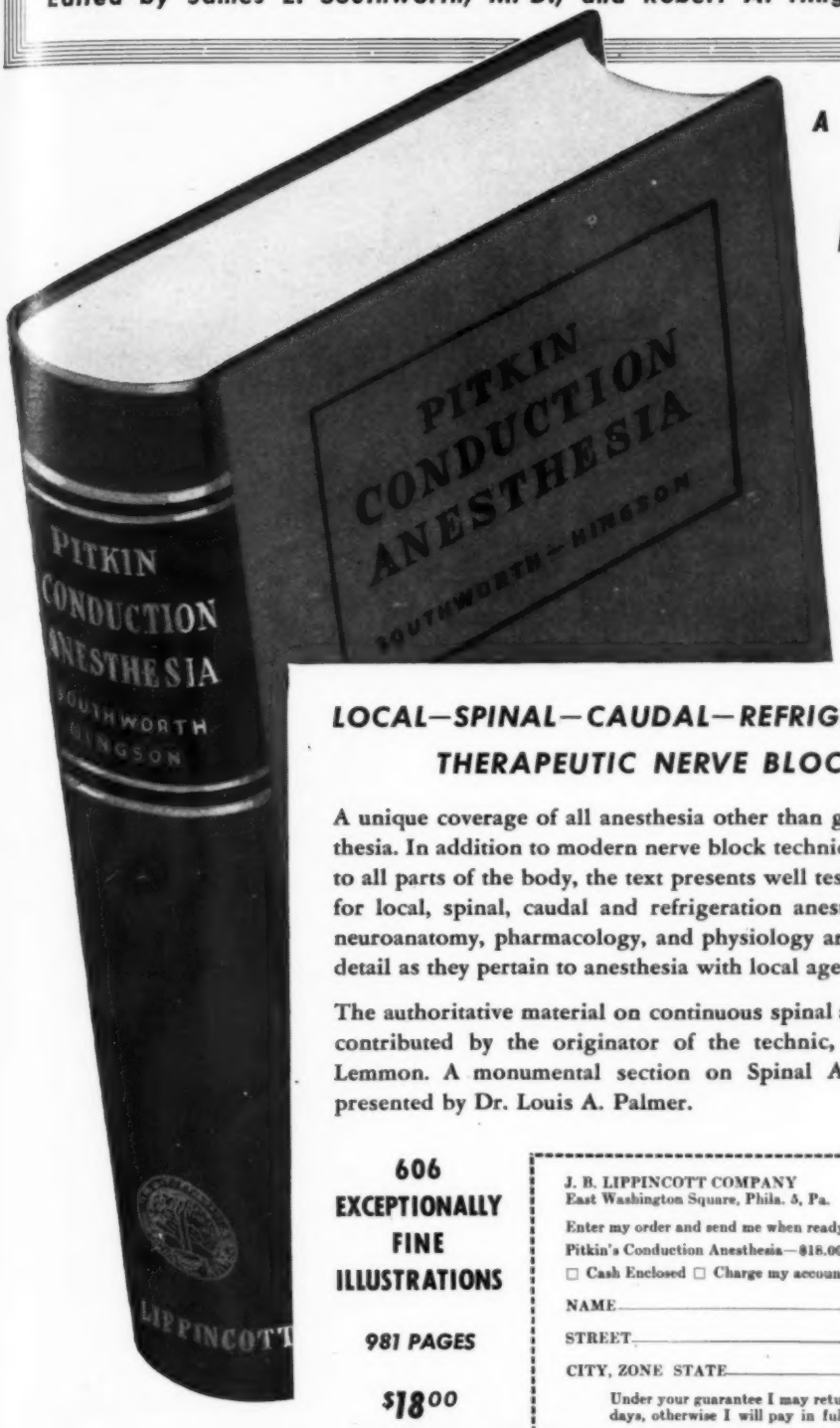

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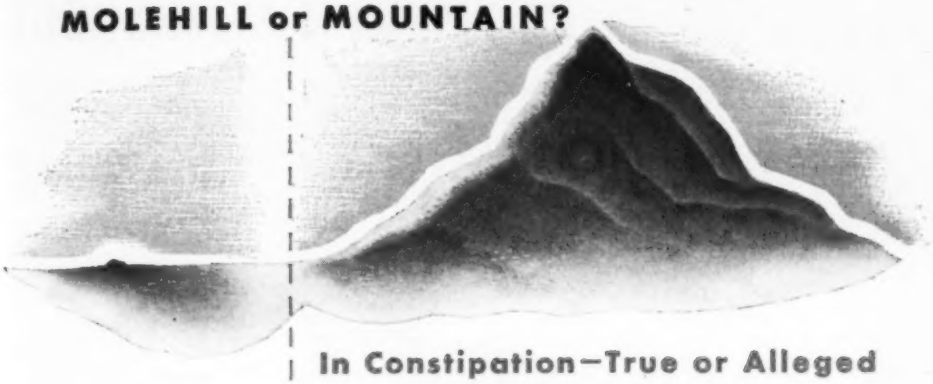

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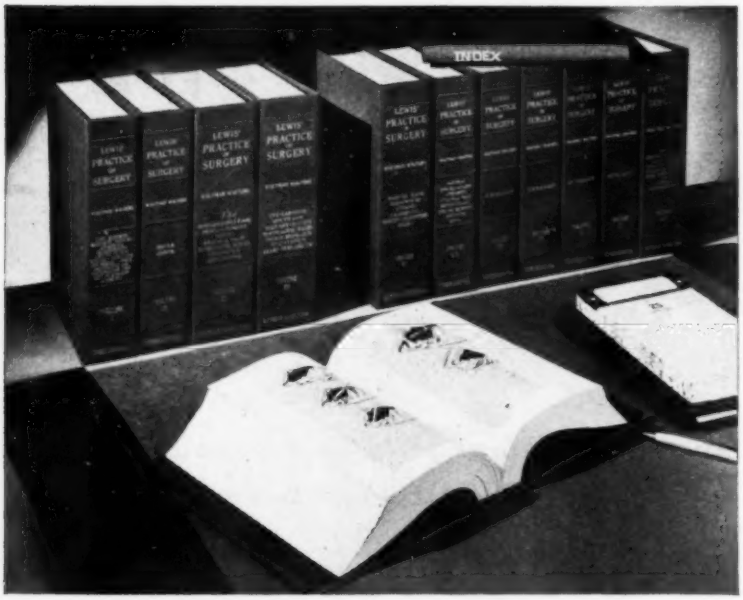

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The Brennemann-McQuarrie Practice of Pediatrics is an exceedingly comprehensive and practical reference work. Every condition that is encountered in the practice of medicine in the young, from birth through adolescence, is fully considered. Long technical discussions and unnecessary historical data are avoided. The information contained in each chapter is crystal clear and to the point. From infancy through adolescence there are constantly changing patterns due to development and growth. Therefore, a physician who furnishes medical care for children must be as well versed in the means of preserving health and preventing disease as in waging a defensive battle at the bedside when a child is sick.

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2. Gwinn, C. D., et al.: Penicillin lozenges in the treatment of Vincent's infection and pericoronitis, J. South. California State Dent. A., 13: 17 (April) 1946.
3. Wright, R. B., and Rule, R. W.: Penicillin in the treatment of oral lesions. J. South. California State Dent. A., 13: 19 (April) 1946.
4. Schuessler, C. F., Fairchild, J. W., and Stransky, I. M.: Penicillin in the treatment of Vincent's infection, J. Am. Dent. A., 32: 551 (May) 1945.

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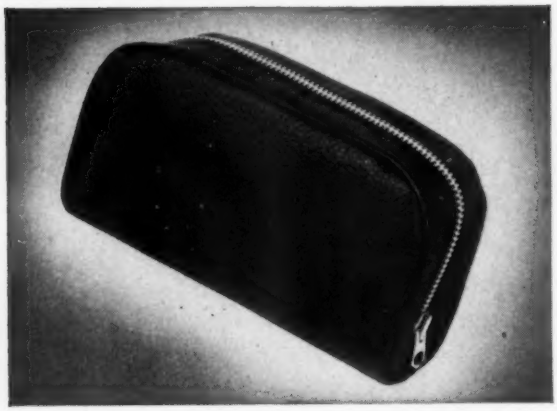

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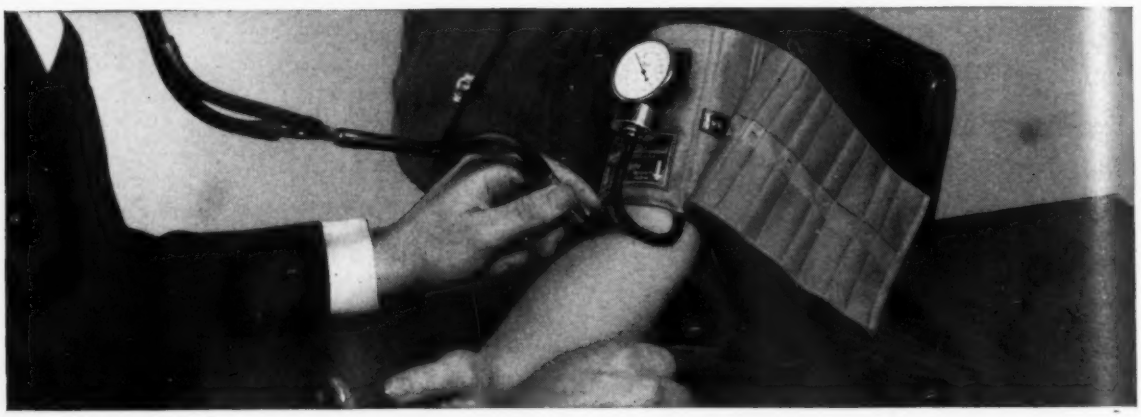

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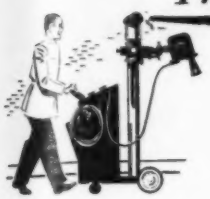

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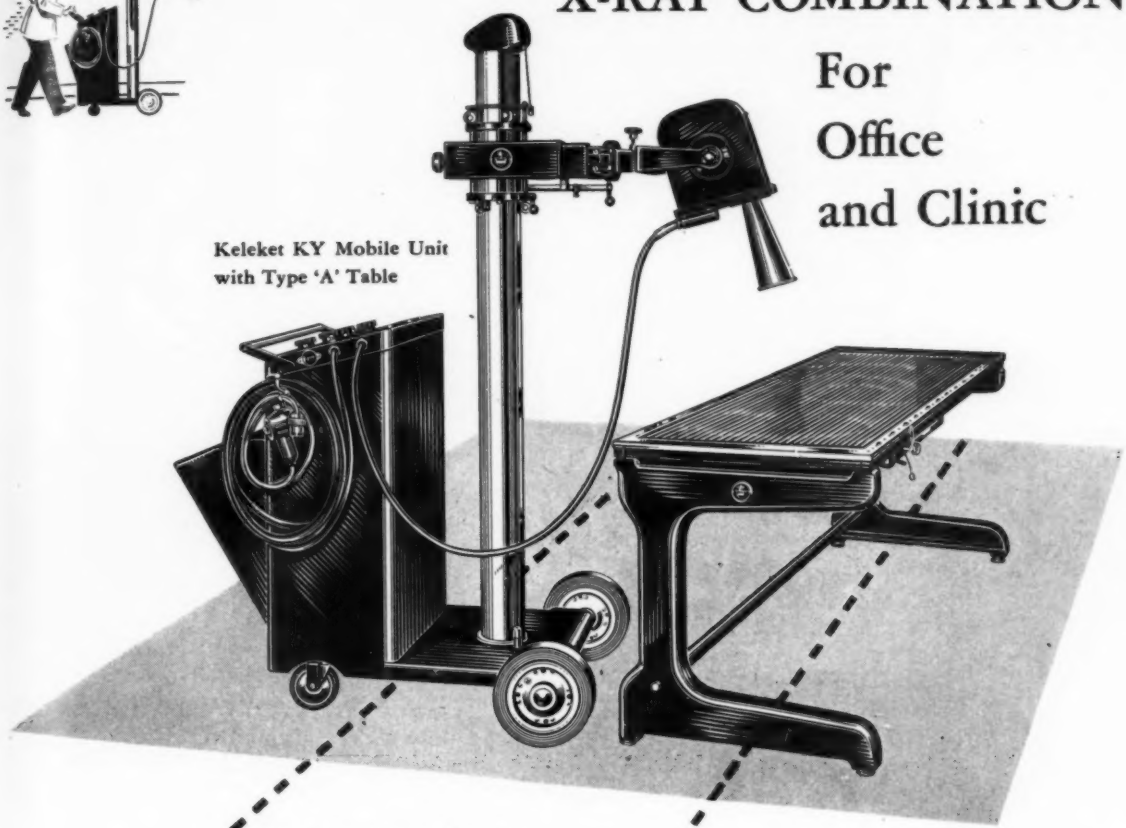

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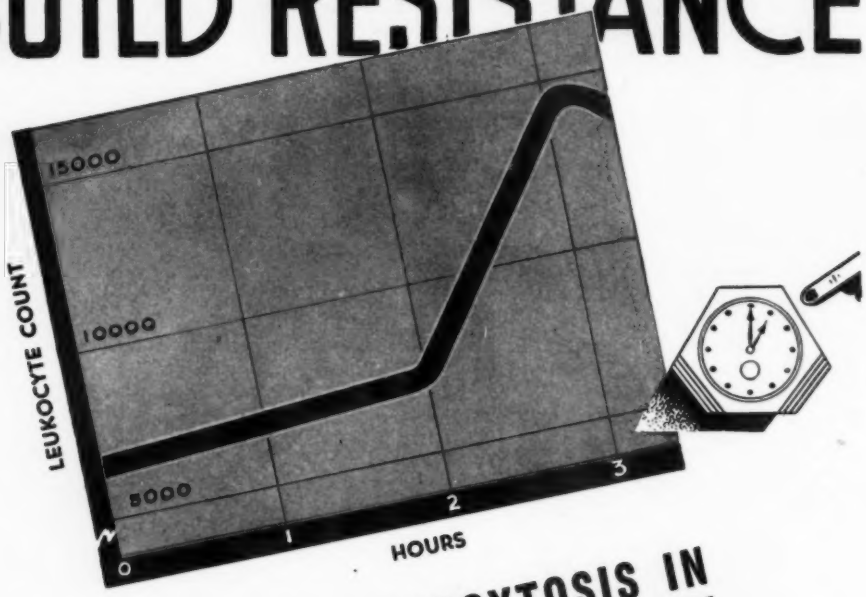

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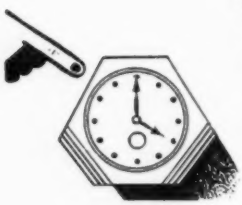

FORMULA: Each Protonuclein Tablet contains Thyroid U.S.P. 4.6 mg.; Pancreas, desiccated 32.4 mg.; Spleen, desiccated 32.4 mg.; Suprarenal, desiccated 16.2 mg.; Thymus, desiccated 16.2 mg.; Brain, desiccated 16.2 mg.; Lymphatic, desiccated 16.2 mg.; Pepsin N.F. 7.0 mg.

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Vitamin B_2 (Riboflavin)	2 mg.
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Niacinamide	10 mg.

Together with other B-Complex factors from liver and yeast.

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A **ROERIG** *Preparation*

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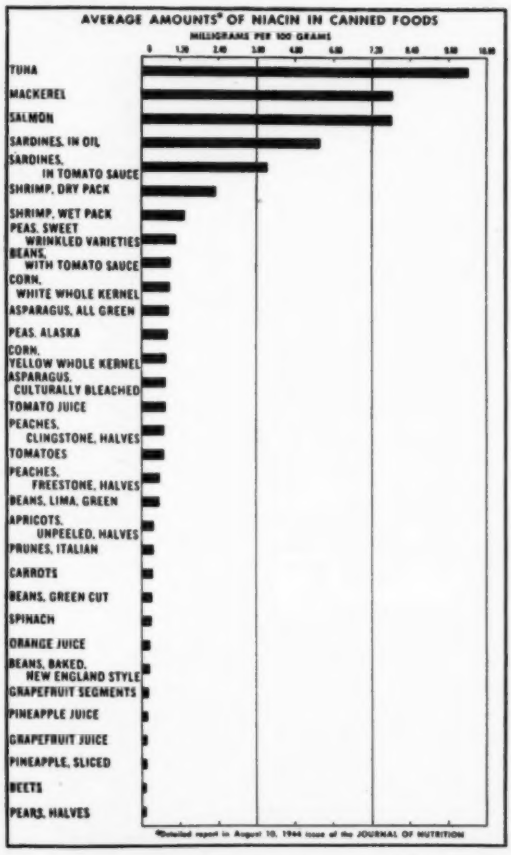

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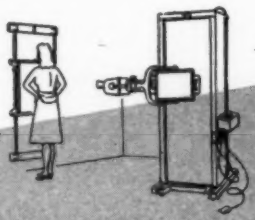
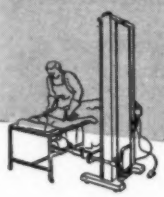


For Every Roentgen Examination You Would Want to Make Yourself



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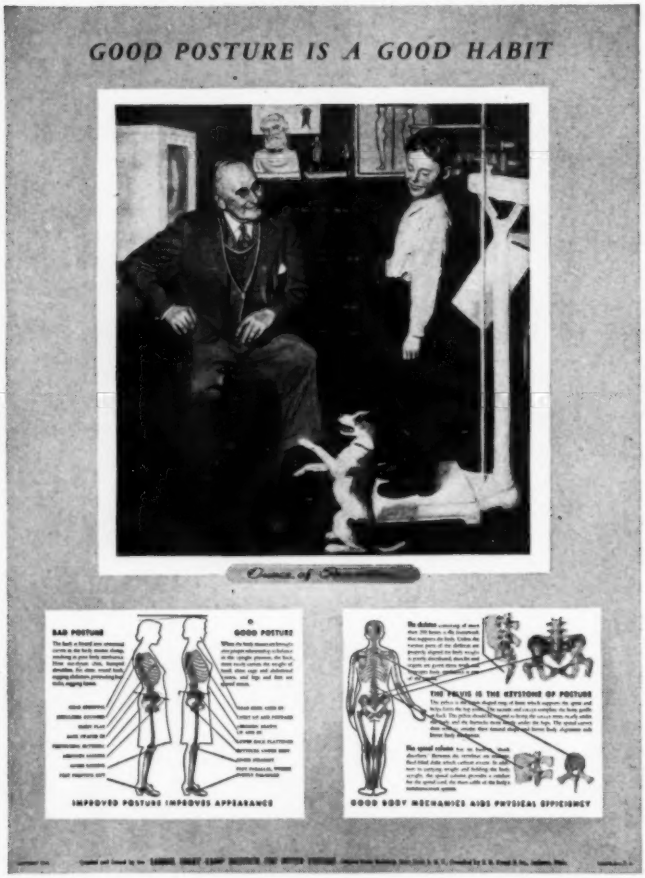
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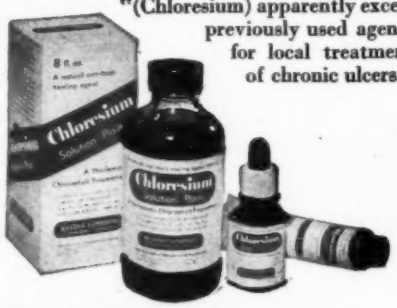

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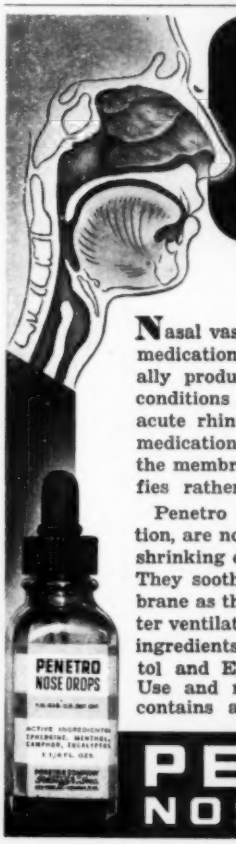

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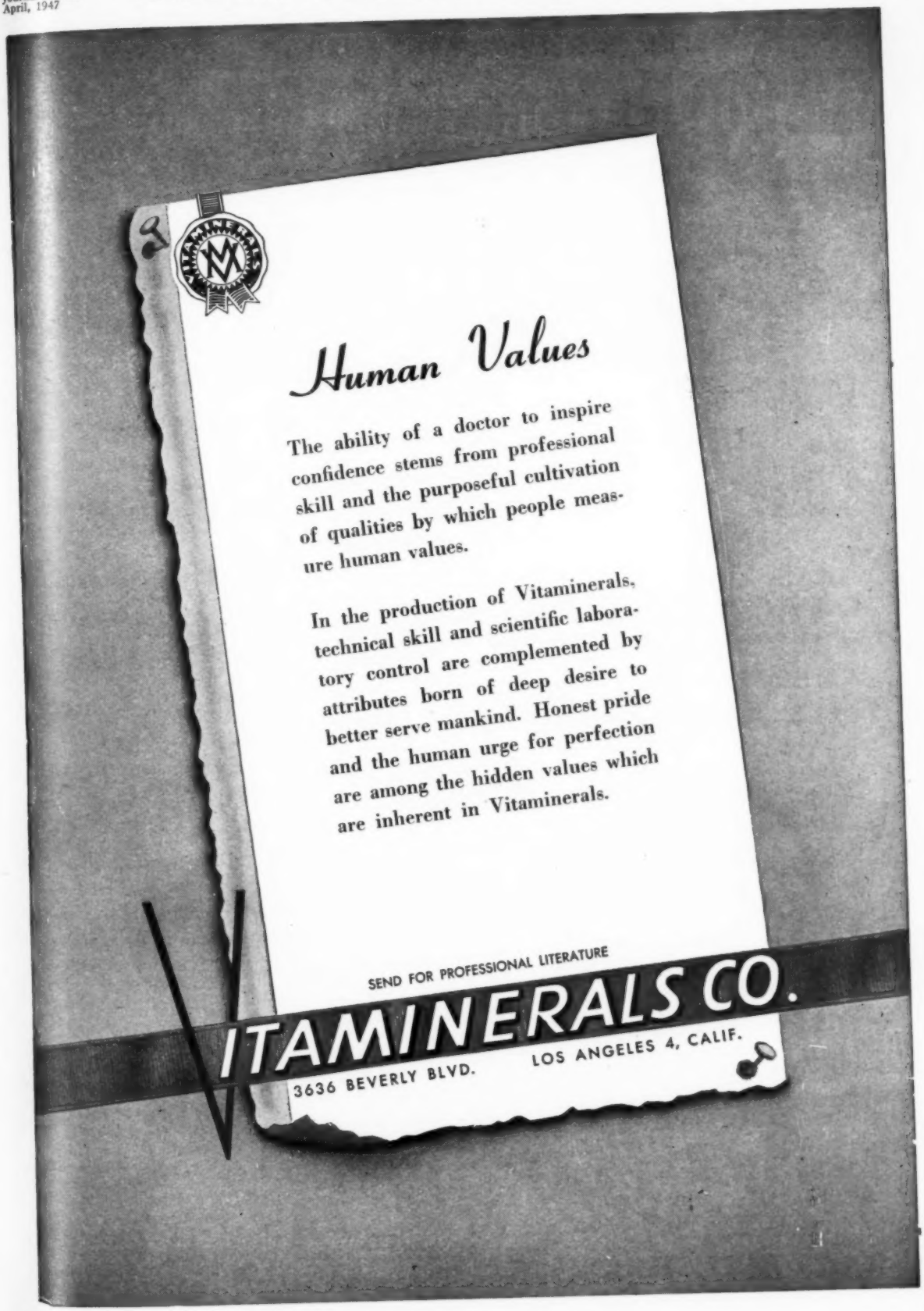
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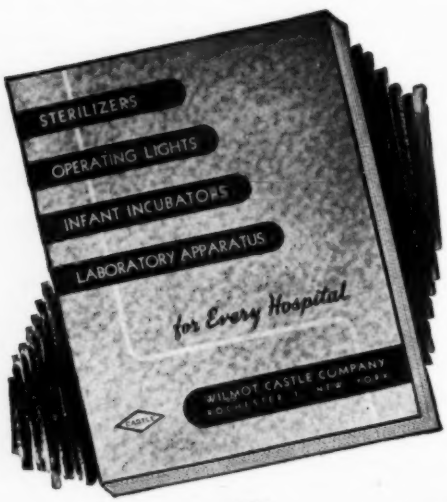

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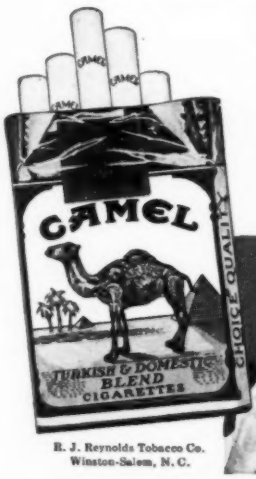

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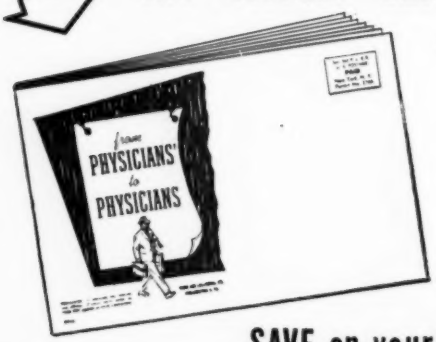

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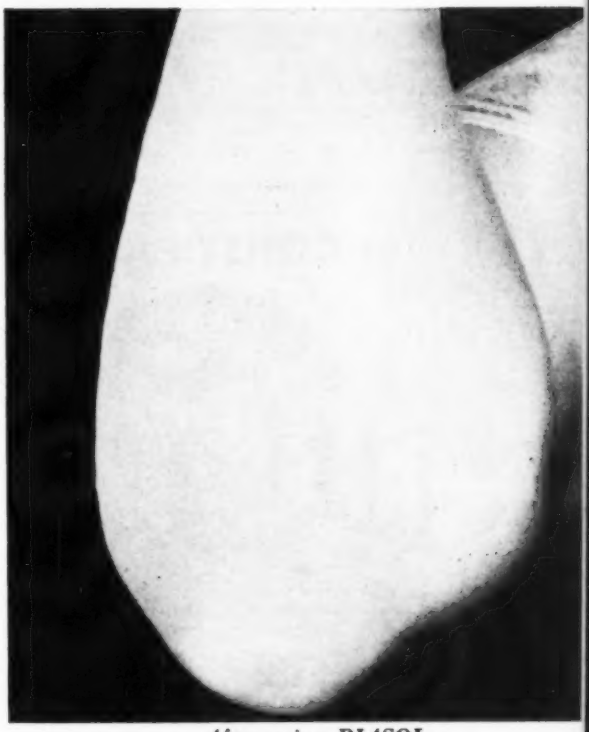

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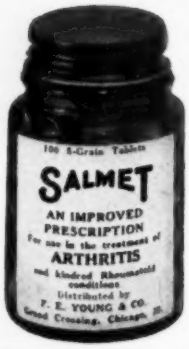

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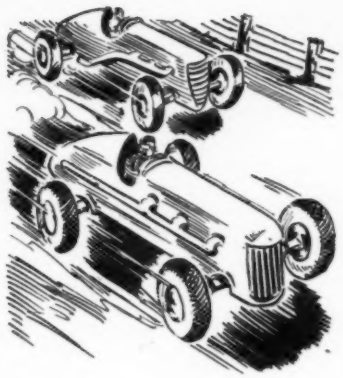

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Gallbladder Disease*

GEORGE J. CONLEY, D.O., F.A.C.O.S.
Kansas City, Mo.

Gallbladder disease is the most common upper abdominal ailment afflicting suffering humanity. It is a concomitant of the life pattern from the cradle to the grave. Babies, new born, are not immune to its influences and no one has ever lived to an age so extended as to outlive its possibilities.

While the teachings emanating from the "seats of the mighty," as late as some 40 years ago, ascribed the limitations of its baneful activity mainly to the fourth, fifth and sixth decades (and this teaching is even now far too prevalent), yet the clinical facts show that, as a rule, the first symptoms, which later in life call attention to the malfunctioning gallbladder, had their beginnings in the teen age and a few antedated that by a full decade.

Babies occasionally are born with gallstones. These stones may be quiescent insofar as severe pain is concerned. The infant may never have jaundice but it very generally has gastric upsets, intermittent in character, usually associated with the holiday seasons and their gastronomic excesses. Many a case of babyhood belly pain, associated with vomiting and a low-grade fever, comes to the surgeon with a diagnosis of acute appendicitis. The removal of the appendix fails to prevent recurrences of similar attacks. A careful consideration of case history, symptoms, and physical findings will locate, as a rule, the pathology under the right costal arch, the normal habitat of the gallbladder.

The gallbladder is the trickiest organ in the abdomen in its propensity to refer the symptoms of its dysfunctions to other localities or structures, apparently unrelated! The diseased gallbladder may cause heart symptoms, ranging in severity from occasional attacks of palpitation to that simulating the more severe, drastic, dangerous complex known as angina pectoris. It may manifest pain in either shoulder or arm, in the right or left chest areas, in the right suboccipital region, at a point a little above and to the right of the navel, into either of the inguinal regions, across the middle of the back, or up under the right or left shoulder blades. It may even precipitate kidney symptoms, varying from those comparatively mild in nature to the most severe attacks of renal colic associated with the appearance of blood in the urine. It may be the origin in many instances of allergic reactions and may be productive of asthmatic attacks. Another aspect of gallbladder disease, given little heed by the average practitioner and far too infrequently mentioned in the literature descriptive of gallbladder manifestations, is its influence on the nervous system. Rehfuss and Nelson,[1] under the caption of nervousness say: "Gallbladder patients usually show this nervousness by exhibiting frayed nerves, irritability of temper, insomnia, periods of depression and occasionally acute psychosis."

Having pictured briefly the vagaries of the symptoms of the diseased gallbladder, the next and very important question is the why of the point of low resistance which makes the gallbladder vulnerable to infection.

Andrew Taylor Still, M.D., laid down a postulation, in connection with his system of therapy which he called osteopathy, to wit: "The rule of the artery is supreme." Any deviation from normal of the circulation of the blood or lymph flow to or from a structure which persists beyond the limits of physiological need, renders that structure vulnerable to disease. And here lies the crux of the whole problem.

Every doctor knows, or should know, that the caliber of the blood vessels is controlled by the vasomotor nerves distributed thereto. Any irritation or interference to that nerve supply, rendered permanent by anatomical structural derangement, will modify the amount of blood distributed to the structure which will determine its vulnerability.

Still, recognizing this fact, deduced therefrom the concept of the *osteopathic lesion* which alone accounts logically for the origin and perpetuation of that mysterious influence which gives rise to the susceptibility of tissue to bacterial invasion. Not only did he demonstrate conclusively the clinical truth of such a deduction, but also every osteopathic physician of competency has confirmed his conclusions by personal experience.

With reference to innervation Boyd[2] says, "The gallbladder has a double nerve supply, partly cerebrospinal from the vagus, partly sympathetic from the ninth dorsal segment. The vagus is the motor and secretory nerve; it inhibits the sphincter. The sympa-

*Delivered before the Osteopathic Technic Teaching Group at the Fiftieth Annual Convention of the American Osteopathic Association, New York City, July 18, 1946.

thetic is the sensory nerve to the gallbladder, and the motor nerve to the sphincter." Osteopathic lesions affecting either aspect of the nerve supply may contribute to the delinquency of the gallbladder. Either may be responsible for effecting that point of low resistance so necessary for the production of pathology.

The lesions most commonly present is cholecystopathies occur at, or near to, the seventh thoracic vertebra. These have been found in the first few years of babyhood and very generally in association with gastric upsets. They are found almost invariably in association with adult cholecystopathies. When one remembers that a long period (33 years according to Ochsner) elapses between the onset of the symptoms and the later positive diagnosis of gallbladder disease, the insidiousness of the influence of the osteopathic lesion becomes apparent clinically.

Reasoning from cause to effect in terms of applied anatomy and physiology, lesion and pathology of gallbladders must be associated, the former antedating the latter. As the prime etiological factor in cholecystopathies, the lesion holds first consideration. Not only that, but its influence must occupy a major place in whatever method of attack, palliative or surgical, is used to eliminate the pathology present.

INFECTION OF THE GALLBLADDER

First, the infection may be, and most frequently is, blood borne—the so-called hematogenous route. Second, there is the old theory of an ascending infection from the duodenum, up the common and cystic ducts to the gallbladder. Third is the selective affinity of certain bacteria for the environmental conditions resident in gallbladder tissues. Fourth, the infection may reach the gallbladder by way of the lymphatics from the liver. Fifth, infections arising in the pancreas find their way back to the gallbladder. Sixth, the physiological function of the liver itself is of etiologic interest.

The liver is the great bacterial filter of the body. All the blood from the digestive tract is returned to the general circulation through it. (The spleen contributes approximately 20 per cent of the portal circulation). It is the great scavenger of the defensive mechanism. Purposefully nature has given the average individual approximately ten times as much liver substance as is actually needed in the daily economy of the body. However, in times of stress, as in the acute abdominal infections, of which typhoid fever is the most marked offender, the liver is overwhelmed with the tremendous influx of bacterial and toxin content of its portal blood. Naturally, a great deal of these deleterious components pass through the defensive lines and make their escape into the bile, thence through the bile ducts and the cystic duct to the gallbladder.

Regardless of the manner in which the infection reaches the gallbladder, the vulnerability of the latter, which renders disease possible, remains almost wholly an enigma to the research worker, except in the obvious case of stasis in that structure caused by pressure during the late stages of pregnancy. Stasis of the fluids in any area predisposes to infection.

Stasis of bile in the gallbladder due to mechanical interference, as found in the later months of pregnancy and arising from portal encroachments, is also a potent factor predisposing to gallbladder infections. This accounts for the high percentage of women who have bourne children left so afflicted (approximately 80 per cent).

PHYSICAL FINDINGS IN GALLBLADDER DISEASE

In gallbladder disease the physical examination is most important. It is the keystone in the arch of diagnosis.

The osteopathic method of spinal examination is the sine qua non to the solution of the problem. One should look for lesions, particularly in the areas affecting the vagus, the phrenic and the sympathetics reaching the gallbladder from the ninth segment of the cord which corresponds with the level of the seventh or eighth thoracic vertebra. Almost invariably one will find the seventh thoracic in lesion and associated with marked tenderness and muscular contraction on the right. There will also be an area of muscular contraction and severe pain about two fingers' breadth to the right of the twelfth thoracic spinous process.[3]

The bony end of the eleventh rib on the right will be very tender. Muscular rigidity under the right costal arch corresponding to the origin of the right rectus muscle is present. There will be tenderness even to extreme pain evinced when finger pressure is made under the right costal arch. The modus operandi for such an examination is as follows: Patient sitting, relaxed, leaning slightly forward to relax the rectus muscles; doctor standing behind the patient with the fingers of the right hand hooked under the right costal arch. The patient is asked to inhale deeply. The relaxed fingers of the doctor follow the belly wall downward. On exhalation the fingers slip up under the costal arch. On the next deep inhalation the fingers are held firmly under the costal arch opposing the descent of the liver and gallbladder. When the sensitive fundus of the gallbladder meets the resistance of the fingers, pain is elicited and the inhalation effort is cut short. This indicates the gallbladder as the seat of the pain.

Another method may be used with the patient in dorsal position, legs flexed on thighs, and abdomen relaxed, the flat of the thumb of the doctor held parallel to and just under the right costal arch. On exhalation, the thumb slips up under the costal arch so that when the next deep inhalation is made, the thumb held rigidly under the costal arch meets the descending gallbladder and causes pain.

The patient may be put in the prone position and the fingers of the doctor's right hand slipped under the costal arch whereby the same maneuvers will be painful to the patient.

The patient may lie on the left side, legs flexed on abdomen to relax its wall and the fingers of the doctor's right hand slipped under the right costal arch as the patient exhales, with the usual results. In this position the intestines tend to fall away from the gallbladder area and will offer less interference to the success of the test.

There will be pain at the pancreaticoduodenal angle, the angle formed by the intersection of a vertical line dropped from the suprasternal notch to the navel with a similar line projected from the right nipple to the navel. It may well be considered here that oftentimes a loose interpretation of this painful area is ascribed to acute appendicitis and a diagnosis rendered accordingly.

Moynihan,[4] quoting John B. Murphy says, "According to Murphy in obstructions to the pelvis of the gallbladder or to the cystic duct, the pain is referred on an average in seven cases out of ten, to the right

subscapular region; and in two cases out of ten, to the front of the chest as high as the neck."

SYMPTOMS

The most common, as well as persistent, symptom of chronic cholecystitis is a mild form of indigestion, characterized by flatulence, gas after eating, a sour stomach or a feeling of fullness in the epigastric area. There will be, as a rule, a sensation of distress or discomfort centering in the epigastric area and radiating generally to the right around under the costal arch, upward beneath the right scapula to the root of the neck and the suboccipital area. Headache, nausea, vomiting and dizziness may be in association.

The pain or discomfort may be referred to the left precardial area. The right chest wall may occasionally bear the brunt of the distress, while on other occasions the center of disturbance will be at the right pancreaticoduodenal angle, or may manifest itself in a most vicious type of renal colic with blood, microscopic and macroscopic, in the urine. Severe occipital headache with heavy cervical muscular contractions closely approximating beginning cerebrospinal meningitis, has had its place in my experience. Once in a while all pain and discomfort will be referred to the splenic area on the left or to the left inguinal region.

The old, time-honored trinity of symptoms considered some 45 years ago so dependable as well as indispensible in the diagnosis of gallstones were colic, jaundice, and the finding of stones in the feces. Unfortunately, colic is absent in 66 per cent of the cases, jaundice is absent in 86 per cent and the finding of stones in the feces is very rare.

Let me inject an observation here relative to colics of abdominal origin. Colics originating in a hollow viscus of pathological origin are severe and characterized by ceaseless restlessness on the part of the patient. He shifts, turns, twists and changes his position in the vain endeavor to get surcease from his pain. He may get out on the floor and roll over and over or he may, as in a case of my own suffering from renal colic, stand on his head in the corner of his room and kick his feet violently in the hope of "shaking something back" for expected relief.

On the other hand, the pain of perforation, or the rupture of a viscus, or the pain of acute pancreatitis is marked by rigid immobility on the part of the patient. He has a look of apprehension on his face and he fears that the slightest move or even a jar to the bed, may precipitate another attack of the agonizing pain. This is a most useful clinical observation.

Nausea or vomiting may be a concomitant symptom and in severe attacks the vomiting may be persistent for hours or even days. Fever is a symptom only in the presence of an acute exacerbation of an old infection.

The "acute temperature angle of cholangic infection" of Murphy or the "church steeple type of temperature angle" of Moynihan is characteristic of infection at the neck of the gallbladder or in its ducts.

Leukocytosis likewise is not a dependable sign except in acute manifestations of inflammation. Chronic constipation of the spastic type is the rule although severe diarrhea may at times be a concomitant.

The famous epigram of John B. Deaver, of the Lankenau Hospital of Philadelphia, "Fair, fat, forty, belching, gall stones," is characteristic.

The inability to take certain foods without subsequent discomfort, such as navy beans, cabbage, onions, fried greasy foods, eggs, cream, and rich heavy pastries, is significant of gallbladder dysfunction. This discomfort has its origin in flatulency; cardiac dysfunctions such as palpitation, tachycardia and extrasystoles may be in association. Essential hypertension has one of its factors located in gallbladder dysfunction.

As a rule, and a dependable one too, a case history revealing a previous attack of typhoid fever, a pregnancy, or an attack of acute appendicitis in association with gastric upsets, should guide the clinician's first attention to the gallbladder.

X-RAY

The x-ray, valuable as it is as an adjunct when it confirms, illuminates or clarifies the findings of the case history, the physical examination, and the clinical symptoms, is not only worthless in its negative aspects but also it may confuse and confound the clinician, may blind the patient as to the seriousness of his condition, and may inject a serious hazard to the proper diagnosis, the necessary line of treatment, and the prognosis generally.

The average layman views the x-ray, and particularly the fluoroscope, as comparable to a window glass. They imagine one views, through the fluoroscope, the workings of the internal body machinery much as one contemplates the activity taking place on the outside of a room as viewed through the window. They think, if the x-ray shows nothing abnormal, that the structure under examination must of necessity be normal, whereas nothing may be further from the truth.

If x-ray findings are negative, then the report should state that insofar as the x-ray is concerned it has nothing to offer in the diagnosis of the offending pathology. Far too often the report reads "X-ray visualization from one or more angles reveals the shadow of the gallbladder of homogenous density, smooth in outline, and normal in size, shape and position. It empties in normal time. There is nothing the matter with it."

The non-astute clinician may accept this as final. The patient, blinded by his faith in the infallibility of its findings, eliminates the possibility of the presence of a diseased gallbladder and refuses to give heed to any counsel as to treatment directed to that structure.

John B. Murphy, reputed by surgical clinicians the world over to be the teacher of teachers of clinical surgery, was very fond of saying that when the laboratory findings were at variance with the facts derived from a sequential case history, the clinical symptoms or the physical examination, to doubt the laboratory.

X-ray study of the gallbladder is of value; preferably the dye should be given intravenously. Why? The absence of a shadow following the oral introduction of the dye immediately raises the question as to whether there has been absorption of the dye. In a case of mine it was found that the head of the opaque meal was entering the cecum within 3 minutes after being ingested. Obviously, under such a condition of hypermotility, nature would have very little, if any, chance at absorption. Given intravenously it must be eliminated through the bile, hence absence of shadow would mean that bile either could not enter the gallbladder or the gallbladder had lost completely its power of concentration. In either event it would be a diagnostic factor.

A gallbladder that fills but which does not empty; one wherein the outline is irregular or shows twisting on its long or transverse axis; a shadow showing punched-out holes or thin spots in the dye; a shadow showing reticulations; an enlarged shadow with poor dye concentration and a sluggish emptying time; or a shadow which is smooth in outline and hangs parallel to the spine, with poor concentration and lack of normal emptying qualities—all have diagnostic value.

A gallbladder with negative x-ray findings but associated with a classical clinical picture is far too often found, on operative exposure, to be so diseased as to be beyond Nature's power to restore. I have found massive pericholecystic adhesions with stones, and occasionally inflammation bordering on gangrene. Other surgeons have reported similar conditions. For instance, Walters and Snell[5] state: "On innumerable occasions an acutely inflamed, edematous gallbladder and a cystic duct obstructed by stones have been found at operation, although definite pathologic change had not been apparent on roentgenographic examination."

They also state: "On the whole there can be no reasonable doubt that cholecystography is one of the most truthworthy tests at the service of the clinician. But it would be most unfortunate if the treatment of any patient were ever based exclusively on the results of cholecystography, for the data and diagnostic deductions it yields, however closely they may approach accuracy, are not offered as substitutes for those derived from clinical examination and clinical judgment."[6]

DIAGNOSIS

The gallbladder is the most difficult organ for which to estimate the relation of symptoms to the extent of pathology. Oftentimes its most severe clinical expressions may be linked with what appears, upon visualization and direct palpation, to be the mildest degree of pathology or even draw the decree of nonexistent pathology. On the other hand, extreme paucity of symptoms of the mildest character may be associated with a hopeless degree of pathology insofar as nature's ability to repair unassisted is concerned.

The factors upon which the diagnosis must be based are elicited from the case history, which also carries the symptoms and the physical findings. All else is as nothing in comparison.

The history usually reveals a mild type of indigestion covering a period of many years, marked by flatulency. Behind this there is as a rule an attack of typhoid fever, a pregnancy, an acute appendicitis, a peritonitis, local or general, or an acute pathological manifestation somewhere in the respiratory tract.

Pain or discomfort will be found under the right costal arch radiating upward beneath the scapula to the root of the neck (the so-called phrenic neuralgia) and the right suboccipital area. This occurs seven times in ten. Once in the ten it will manifest itself in the left shoulder and down under the left scapula; twice in ten to the chest, extending up to the clavicle on the left, often simulating an angina pectoris. A tender area will be found at the pancreaticoduodenal angle.

Pain with muscular contraction will be found about 2 inches to the right of the twelfth thoracic spine. Gallstone colic is the exception rather than the rule.

The perpendicular finger percussion method of Murphy is a simple expedient for the elicitation of pain in a cholecystopathy: Patient in dorsal position, legs flexed on abdomen; clinician on patient's right facing his feet, the middle finger of the left hand hooked under the right costal arch; the patient is asked to exhale. The finger follows the liver edge up under the costal arch and is held firmly in situ while the patient is asked to inhale, hold his breath, and strain down as in forcing a bowel movement. When the downward pressure is strong, the back of the hooked finger is struck smartly with the right fist. If pathology is present, the reaction will be associated with severe pain; if not, the patient will be startled but will not complain of any severe pain. There will be pain at the bony end of the eleventh rib on the right.

Osteopathic joint lesions affecting the vagus are found in the upper cervicals (first, second, third), and those disturbing the sympathetics are at or near the seventh thoracic vertebra. A lesion of the seventh is practically always present and a most dependable guide to the proper diagnosis. This lesion is found very frequently in the little ones in the first decade of life who have digestive dysfunctions. All pediatricians should ever be on the alert to examine this area in all children coming under their care for it is the prime factor in bringing about a condition of vulnerability in the gallbladder which may give rise, some 30 years later, to a cholecystopathy. The youthful period is the time to fix it.

Fever is not a factor in diagnosis for it generally develops only in the presence of an acute lighting up of an old infection. It has been my observation that in the presence of a low grade fever or a mild manifestation of afternoon temperature rise—suggestive of undulant fever—the pathological gallbladder must be taken into account.

In acute infections affecting the fundus of the gallbladder, the type of temperature is septic and runs from 100 to 102 F. for the lymph structures in the fundus are sparse, bringing about a minimum of absorption.

In acute infections of the cervix of the gallbladder, the cystic and common ducts, the reaction is startling and pathognomonic. The temperature graph sheet on the chart shows extreme angulations reaching 105 to 107 F. Then in a few hours it drops back to normal or thereabout.

GALLSTONES

The positive diagnosis of gallstones in the average case is very difficult to say the least. Thickened bile, shot through with cholesterin sand, plugs of pus or mucus, may so irritate the mucosa of the gallbladder and the biliary ducts as to give rise to the typical picture of gallstone colic, whereas the so-called "silent stone" may give no evidence of its presence clinically in terms other than a mild indigestion.

Aschoff,[7] in his "Lectures on Pathology," postulated a pseudocholololithiasis of nervous origin which might give rise to colic of the most severe type.

The x-ray that reveals apparently normal findings may conceal hundreds of small stones so disposed that the dye they displaced does not reveal the characteristic mottling. A calcium-coated stone will yield a positive shadow. A stone large enough to displace a sufficient amount of dye will reveal a thin spot or a punched out, hole-like appearance in the

gallbladder shadow. A reticulated appearance of the dye is also considered positive.

Jaundice preceded by pain, usually colicky in type, may be considered positive clinical evidence of stone. The stone will be round or cylindrical and will be in the common duct. The percentage of error is 5 in 100. Characteristic shadow of gallstone appearing on a scout plate is quite rare.

Repeated, severe attacks of gallstone colic, with no other corroborating evidence, should be construed, for clinical purposes, as due to stone.

Gallstones have been found very early in childhood, even in the extremes of infancy. Wendell[8] has described a case in a child 11 days old who harbored 90 small cholesterol stones. Eusterman has collected from a series of 13,500 operations on the biliary tract 54 cases (0.4 per cent) in which gallstones were found in examination of individuals of both sexes who were less than 25 years of age. Freidenwald and Ullman[9] also have described the finding of gallstones in the gallbladder of five persons between the ages of 15 and 18 years.

Personally, I have had two cases of gallstones in girls, one 14 and the other 15 years of age, as evidenced by clinical symptoms and surgical demonstration; and a third case in a girl aged 8 years, suffering from intractable attacks of vomiting clearly due to gallbladder dysfunction. On incision, the gallbladder was found to be hopelessly involved in massive pericholecystic adhesions.

These cases represent outstanding manifestations of pathology involving the gallbladder. They take no cognizance of the numberless patients manifesting mild indigestion of gallbladder origin which, with the accumulation of years, results in massive pathologies.

On the appearance of stones in the newborn there is nothing, insofar as my knowledge goes, that furnishes positive etiological findings except the possibility of the presence of hemolytic anemia.[10]

Has a definite osteopathic lesion preceded such findings? No one knows. We do know, however, that the normal gallbladder concentrates the bile ten volumes during the intervals in digestion. Also under the influence of diseased action, the concentration has been speeded up to fifty volumes, producing visible cholesterin sand in a very few hours. It is also reasonable to assume that many spinal joint lesions are assessed againt the infant due to the trauma of labor.

DIFFERENTIAL DIAGNOSIS

Inasmuch as the stomach is the chief mourner when the gallbladder gets into trouble, it is well to remember that chronic cholecystitis may give origin to symptoms simulating peptic ulcer; also that the ninth segment of the cord, in addition to supplying the gallbladder, innervates the duodenum, stomach and pancreas as well.

It is comparatively easy to identify the classical symptoms of peptic ulcer by the regularity of their appearance at approximately the same time after each meal, day after day, week after week, marked by periods of latency, characterized by spring and fall exacerbations, and yielding to the same means of relief. Contrarily when the gallbladder is at fault, the so-called ulcer symptoms are marked by irregularity in the time of their appearance. They may appear after each meal for a day or so, skip several days, then become manifest after a single meal, and may appear without reference to any food at all.

On physical examination of the spine, the pain and muscular contraction in gallbladder disease appears from the seventh to the twelfth thoracic vertebrae on the right and more particularly between 2 and 3 inches to the right of the twelfth thoracic spinous process, whereas in peptic ulcer there are pain and muscular contraction on the left of the tenth, eleventh, and twelfth thoracic processes.

X-ray will reveal ulcer in approximately 90 per cent of all cases.

Duodenal stasis may simulate chronic cholecystitis. The pain in this condition extends transversely across the abdomen to the left a little above the navel and centering about 1½ inches above and 1 inch to the left of the navel. Malattachment of the ligament of Treitz may be responsible.

X-ray visualization will reveal a dilated duodenum with stasis, a marked tendency for duodenal contents to pass back through the pylorus into the stomach, and hesitation at the duodenojejunal angle. In severe cases the opaque meal may hang in the duodenum for several hours.

The vomiting of duodenal stasis is persistent, frequent, and may be present for days. Malattachment of the ligament of Treitz should be suspected in every case of chronic cholecystitis, marked by a severe, persistent type of vomiting.

Chronic cholecystitis, marked by the presence of massive adhesions, pallor of skin suggestive of a cancerous cachexia, and marked loss of weight and strength cannot be differentiated by clinical symptoms from a cancer except by an exploratory operation. A painless jaundice of the dirty, greenish type of discoloration may point to a malignancy of the gallbladder or of the pancreas.

The point of tenderness at the pancreaticoduodenal angle, together with the digestive disturbances in chronic cholecystitis, may lead the unwary into a diagnosis of chronic appendicitis, leading to the removal of this structure rather than the chief offender, the gallbladder.

It is remarkable the very large number of appendices which have been removed with the gallbladders remaining unsuspected in the face of a classical textbook picture of chronic cholecystitis.

ACUTE CHOLECYSTITIS

The treatment of acute cholecystitis is palliative, as a rule, at the onset of the attack. If nausea or vomiting is persistent, gastric lavage is indicated with the stomach tube. Irrigation should be carried out until the fluids return clear and nothing given by mouth thereafter until temperature, pulse, and blood count indicate improvement. This will occur within 24 hours.

Continuous moist heat should be applied to the entire liver area. My preference is a large bath towel wrung out of hot water, wrapped around the body at the level of the liver, covered with a dry towel and heat maintained with the use of the electric pad or hot water bottles.

Five hundred cc. of dextrose by venoclysis, 75 drops per minute, should be given at 8 hour intervals. Usually two administrations are sufficient before fluids are ordered to be given by mouth. Then a solution consisting of 15 teaspoons of dextrose (or Karo), the juice of two oranges in 1000 cc. normal salt solution may be used as a beverage, a glassful every 2 or 3 hours, plus a liberal amount of water to maintain the fluid balance.

A diet of citrus fruit juices, as much as desired, is given until the acute stage subsides.

Correction of osteopathic joint lesions during the acute stage, in my judgment, is contraindicated. Gentle, thorough spinal muscular relaxation throughout the cervical, upper and midthoracic areas with suboccipital inhibition for a period of 3 minutes usually suffices. Manipulative treatment should be given morning and evening.

Penicillin, 40,000 units intramuscularly at 3 hour intervals, may be used as a precautionary measure in the face of a vicious onset as evidenced by elevated temperature, increased pulse, high white blood count, and a high polynuclear count.

If there is no improvement in 24 to 48 hours, or if clinical symptoms and blood count (which should be taken at 12 hour intervals) indicate infection is spreading, then surgery must be instituted at once because of the danger of gangrene developing. Also, sudden cessation of pain with all other symptoms getting worse is an indication for immediate resort to surgery.

X-ray visualization is contraindicated during the acute attack. Later on, in the stage of quiescence, x-ray is of assistance in diagnosis and acceptable to the well-being of the patient.

The survey of clinical conditions, physical findings, blood counts, x-ray information, and the general appearance of the patient will be the guide to future treatment.

TREATMENT OF CHRONIC CHOLECYSTITIS

Alvarez has said, "Perhaps it would be best for the mental development of all of us physicians if we would more often admit that there is no logical medical or dietary treatment for cholecystitis, especially when bile has ceased to flow easily into and out of the gallbladder, or when the organ is full of stones, or its wall is stiffened with scar tissue and full of bacteria."[11]

Walters and Snell state, "No form of cholecystic disease, gallstones in particular, appears as a primary disorder; there must be an initial injury to the structure and function of the gallbladder, which in turn may develop to the point of complete functional incapacity, formation of stone or state of chronic infection, individually or in combination. The nature of these hypothetical initial injuries never has been satisfactorily determined; one or several factors may be responsible."[12]

The authorities mentioned express the general consensus of medical opinion with respect to the palliative treatment of cholecystic diseases. The cause of the point of low resistance in the gallbladder which renders it vulnerable to infection remains an enigma to the medical research-minded. Reliance upon dietetics, the various forms of sodium sulfate and the combination of the biliary salts and duodenal intubation for curative results has been thoroughly exploded by Alvarez.[13] No doubt such a regime tends to minimize the effects of cholecystic disease, but entire dependence placed upon it for permanency of relief is fraught with disaster. The dictum of Skoda that we can diagnose disease, describe it, and get a grasp of it, but we dare not expect by any means to cure it (by drugs) is distinctly applicable to the present-day status of gallbladder therapy. Walters and Snell[14] say: "It appears clear that the surgical results in an unselected group of cases would be superior to results of medical treatment."

Medicine has little if anything to contribute to the fundamental treatment of this, so prevalent as well as troublesome, disease. Inasmuch as its etiology is still shrouded in mystery, efforts at treatment consist entirely in mitigating its effects. Laxatives, cathartics, cholagogues, the various gradations of the biliary salts, their numerous combinations, each with another and often assisted by a gentle aperient, supplemented by rigid dietetic requirements, all result in the same end—failure insofar as a permanent relief is concerned.

A knowledge of the etiological factor must always precede an intelligent concept of its treatment. Except in the case of pregnancy and the biliary stasis which it produces in its later months by pure mechanical pressure, medicine has nothing to offer to explain the locus minoris resistentiae which results in an infected gallbladder. Even that may be subject to critical discussion and constitute a debatable point.

Insofar as my knowledge goes it remains for the illuminating aspects of the concept of the osteopathic lesion to furnish adequate reason, based upon applied anatomy and physiology, to account for this vulnerability in the gallbladder's natural lines of defense against infection.

Andrew Taylor Still blazed the trail. He demonstrated clinically at the bedsides of those pronounced incurably ill, as judged by the medical standards of his day, the efficacy of the "concept of the lesion."

It remained, however, for Louisa Burns to demonstrate, by scientific research methods, just what occurs to the gallbladder following the irritating effects of a spinal lesion at or very near the origin of its sympathetic nerve supply.

Carter H. Downing,[15] in his "Osteopathic Principles in Diseases," quoting Louisa Burns says: "Following lesion of the seventh thoracic segment the walls of the gallbladder and spleen become wrinkled and these viscera become diminished perceptibly in size; color paled slightly.

"Thereafter the walls relaxed, the blood vessels filled beyond normal, the color became dark and venous and the size of the viscera mentioned increased somewhat above the normal. This condition was permanent."

These are the very early results of the effect of the lesion and represent stasis in the venous side of the gallbladder circulation. What must be its condition after an interval of 10, 20, or 30 years have elapsed with an infective process imposed upon it. Incidentally to what extent have the liver, the duodenum, the pancreas and the stomach been damaged by the dysfunctions brought about in them by this same lesion? It is not to be wondered that the postoperative results upon patients subjected to cholecystectomy alone without adequate follow-up treatment to relieve the primary etiological factors, so frequently fails to give these patients the full relief which they had every reason and right to expect.

When both the primary etiological factors and the secondary damages have been ignored completely, then the primary treatment, be it palliative or surgical, is doomed to disappointment.

Palliative treatment has a chance for success if it be instituted early in the inception of the disease, if it be directed to the alleviation of the etiological factors and if the patient be kept under observation a sufficient period of time (from 6 months to a year) to insure permanency of results.

Surgical treatment must follow the same general regime because nature needs assistance in removing primary causes as well as the secondary results from the long-continued dysfunctions precipitated by the former.

Surgeons must go a step further than dependence on surgical assault—no matter how well accomplished technically—upon the offending pathology.

The old saying, "Once a diseased gallbladder, always a diseased gallbladder" has a very firm basis of fact behind it. Insofar as medical treatment goes I am inclined to accede to its truth. There is a chance for nullifying the statement when viewed from the osteopathic standpoint. Even this hope decreases directly with the increase of time elapsed between the onset of symptoms and the initiation of treatment. The earlier the treatment is instituted the better the chance to restore normalcy to the function of the gallbladder.

The first step in palliative treatment is to mobilize the lesioned areas affecting the nerve and blood supply to that structure. In my own practice attention is first given to the integrity of the lumbosacroiliac area. Lesions here have a tendency to produce constipation and by producing postural imbalance handicap most seriously corrective efforts directed to lesioned areas in the midthoracic and upper cervical regions.

A very large percentage of the cases of chronic cholecystitis have a severe type of spastic constipation in association. A vitiated type of bile resulting from biliary dysfunction still further aggravates the mucosa of the colon with the inevitable colitis resulting.

With the spinal column square on its pelvic base, then attack is directed against the lesioned areas at or near the seventh thoracic vertebra. This is followed by normalization of any lesions present in the upper cervical areas. In fact, every lesion from the occiput to the lumbosacroiliac area should receive attention. Those mentioned specifically are the most important and are most likely to be present. The liver as well as the spleen must be stimulated.

Treatment semi-weekly, specifically planned, until improvement is noticed, is the rule. Then the interval is lengthened to once weekly for a couple of months, then a 10-day interval for a month, then bi-weekly and monthly for a period of 3 to 6 months.

To correct constipation and to alleviate gastric distress, I advise the patient to drink a pint of normal salt solution, hot, seasoned with the juice of a lemon, then lie on the back with legs flexed on thighs, hands on either side of the body at stomach level and then literally shake the stomach from side to side like washing the inside of a bottle for a few seconds, and then assume the right Sims' position for a matter of 5 minutes. This results in the stomach emptying its contents into the duodenum with the tendency to flush the entire intestinal tract. This should be done on arising and immediately before retiring. The result is practically a gastric lavage, together with a gently laxative effect with no undue harsh reactions to the already irritated mucosa. As improvement takes place, these intervals may be lengthened.

The one dietetic admonition I emphasize is for the patient to "chew the food instead of the rag." I advise thorough mastication, small feedings, and avoidance of heavy rich foods and the known gas producers, such as cabbage, onions, navy beans, greasy foods, and usually milk or cream.

TREATMENT OF GALLSTONES

"Every gallstone is a tombstone erected to the memory of the organisms dead within it," said Sir Berkeley Moynihan.[18] Gallstones are the effect of an inflammatory reaction affecting the mucosa of the gallbladder and as such they must be treated.

Primarily the treatment for gallstones is surgical. Small stones may pass through the cystic duct into the common duct, thence to the intestine, causing very little damage and at times a minimum of discomfort. The larger ones cannot pass through the cystic duct remaining incarcerated in the gallbladder, the number reaching large proportions. In a case in my own practice the number reached was 1,194.

They may cause pressure necrosis of an area in the gallbladder which on the liver side may penetrate into the liver substance; on the side of the abdominal cavity it may slough into the stomach, duodenum, colon, or may float in a puddle of pus restrained by massive adhesions of omentum, stomach, duodenum, small or large intestine. Nature endeavors to perform a surgical operation by the process of inflammation, commonly called pointing, which may rupture into any structure that nature attempts to use as a barricade to protect such an area of weakness.

Colic is the chief manifestation of a moving stone. The quickest, safest, most dependable method of relief from such an agonizing disturbance is not to resort to the ever-present hypodermic, but to gastric lavage, using a stomach tube. The washing process must continue until the water returns clear. Then the stomach must be kept empty for at least 24 hours. Nothing must be ingested, not even water. If vomiting or pain recurs, lavage must be done again. This is more effective as a rule than ½ to ¾ of a grain of morphine by hypodermic and is without danger.

Gastric lavage may be assisted by heavy inhibition applied to the back at the right of the eighth thoracic. This can be done with the patient lying on the face and the thumbs or the heel of the palm making heavy sustained pressure downward for from 5 to 10 minutes.

Or the patient may be placed in the sitting position, with the doctor sitting behind him with his knee against the back just at or to the right of the seventh thoracic, the hands catching the arms just below the shoulders drawing the patient firmly back against the knee until the pain ceases.

If such measures fail, then morphine in some form, administered hypodermically, must be resorted to. In such an extremity my preference and practice are to give a tablet containing morphine ¼ gr., hyoscine 1/100 gr., and cactin gr. 1/64, called by the trade name HMC#1, by hypodermic, then follow it immediately with chloroform by inhalation to deep surgical anesthesia. After 30 minutes I repeat the hypodermic, remain with the patient another 30 minutes, then go about my business or back to bed as the case may be, secure in the knowledge that the patient will sleep at least 12 hours, giving the stone time to pass or, if not, to fall back into roomier quarters in the gallbladder.

In the presence of gallstone colic which refuses to yield to treatment, which persists in recurring, or which manifests jaundice preceded by pain, surgery, consisting of cholecystectomy, must be the treatment. Under such circumstances the common duct must be palpated for stones and in case of doubt it must be opened and a special currette passed.

The technic of such a procedure will not be given

here. Reference to any standard text on surgery will explain the method.

Even after this is done, and the patient has entirely recovered from his surgical seance, osteopathic manipulative treatment directed to the lesioned areas mentioned must not be neglected. Such a patient should be under observation and occasional treatment for at least a year.

Gallbladder drainage is to be resorted to only in cases of a pancreatic involvement or an obstruction to the common duct as in cancer of the head of the pancreas or one involving the common duct.

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Infant Feeding

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Editor's Note: A rewrite of Dr. Wagner's article prepared for lay readers and published in OSTEOPATHIC MAGAZINE *was also published by mistake in the October, 1946,* JOURNAL. *We regret the error and now present the article in its original form.*

No one knows better than the writer the futility of trying to convince a woman that she should nurse her baby when she has decided before the baby was born that she did not intend to nurse it. All of the arguments that a physician can give, regardless of how correct scientifically they may be, fail to stand up against the one statement, "All of my friends have bottle fed babies and their babies are thriving splendidly." So, as a pediatrist, one either sticks to his scientific arguments (in which case he probably will soon no longer be a pediatrist) or else he acquiesces and prescribes a formula for the baby.

Many physicians and many of the laity readily say, "It is probably better to nurse the baby at the breast but . . ." Yet few physicians and fewer of the laity can give you the reason *why* it is better to breast feed the baby. Therefore, a review of some of the reasons why breast feeding is advantageous is in order.

Less Possibility of Infecting the Baby.—Bacterial contamination of mother's milk is not likely provided the mother's nipples are not cracked or fissured or she is not suffering from mastitis or septicemia. Whatever organisms that are harbored in the milk ducts are usually nonpathogenic. However, should some pathogenic bacteria be swallowed, their activity will be inhibited because breast milk has a soft, flocculent curd which permits the gastric acids to act on the bacteria. This is in contradistinction to cow's milk which has a hard, large, tough curd that may readily incase and protect bacteria from the inhibiting action of the gastric juice.

Better Curd Formation.—As just mentioned, the curds of human milk are soft, small, and flocculent, permitting not only better antibacterial effect of the gastric juices, but also better absorption and digestion of the milk. The curds of cow's milk are large and tough. They may even form into a single large jelly-like mass completely filling the baby's stomach.

Not only do the small, flocculent curds of human milk lend themselves to better digestion and sterilization, but also their buffer content is so low that the gastric contents of a baby receiving human milk are quickly and readily acidified and passed into the duodenum in an acid state. In so doing the content of the duodenum is kept acid and bacterial growth is inhibited.

The large, tough curds of cow's milk, on the other hand, have a high buffer content. Under these conditions the gastric juices are unable to acidify completely the gastric content which enters the duodenum in a state of alkalinity, thus permitting the growth of any bacteria carried in with the food or migrating upward from the lower portion of the intestinal tract.

The Protein Content Is More Suitable.—The protein of human milk is quite constant, varying from 1 to 1.5 per cent. Of this 60 per cent is whey or lactalbumin which is almost identical with body protein and 40 per cent is curd protein or casein. The protein of cow's milk is 3.25 per cent and 15 per cent of this is whey or lactalbumin and 85 per cent is curd protein or casein.

Sugar Content Greater.—The sugar of human milk is identical with the sugar of cow's milk, namely lactose. However, in human milk it is 7 per cent whereas in cow's milk it is but 4 per cent. The sugar in human milk is the most constant factor of all its composition. It rarely varies in percentage.

Fat More Digestible.—The fat of human milk is the most variable of all its composition. It is usually around 3 per cent, but may vary from 1 to 10 per cent. It is in the last portion of milk expressed from the breast. The fat globules are small, more digestible, and less irritating than those of cow's milk. The percentage of fat in cow's milk as dispensed by dairies is usually constant from 3.5 to 4 per cent.

Then there are many other ingredients in human milk that either are entirely lacking or markedly deficient in cow's milk such as hormones, vitamins, iron, sulfur, etc. In short, human milk was made for infants and cow's milk was made for calves.

Having briefly discussed the comparative merits of human milk versus cow's milk, it might be well to pass on to some of the problems of infant feeding.

Before getting into the abnormalities of infant feeding, possibly a few words on nursing technic might not be amiss. It is the opinion of the author that when a baby is exclusively breast fed, it need not be kept on a rigid schedule but rather may safely be fed on demand. However, he should not be fed any more often than every 2 hours; he should not be awakened to be fed until 4 hours have elapsed and he should not be fed if he is awake, quiet, and contented.

The milk of the mother will vary from one feeding to the next. If at one time the baby receives a feeding that is inferior in quality and quantity he will become hungry sooner because his stomach will empty itself more readily. The demand schedule, however, does not apply when a baby is receiving any cow's milk either complementing or supplementing the breast. He should be kept strictly on a 3 or 4 hour schedule since cow's milk, being less readily digestible, does not leave the stomach for 3 to 3½ hours.

The mother should nurse the baby in a sitting position, holding the baby semierect. This permits lifting the baby so that his mouth is slightly above the nipple and prevents choking him by too rapid flow if there is an overabundance of milk. At the same time, the baby held high will be able to eructate swallowed air during his period of nursing.

A vigorously nursing baby has his mother's breast 75 per cent empty after the first 5 minutes of nursing and the other 25 per cent in the next 5 minutes. In other words, any time after 10 or 11 minutes of nursing that the baby falls asleep he is through. There is no point in keeping the baby at the breast for 20 minutes to ½ hour.

Unfortunately all breast fed babies do not go along symptom free. Many times the trouble lies not with the baby but rather with the undue apprehension on the part of a nervous or neurotic mother or father, grandparents, aunts, uncles, and even neighbors. There are, of course, numerous instances of symptoms related directly to some faulty technic of nursing.

Vomiting, for example, in a breast fed infant may be caused by too long a period of nursing. When a mother has an overabundance of milk the baby's stomach may become overloaded and it empties. No harm arises from this mechanism. Too long a nursing period at a breast that has an inadequate supply permits the baby to swallow too much air, overdistending his stomach which again may empty itself just as though it were overdistended from too much milk. Too frequent nursing—nursing the baby just because he is awake rather than when he requests it—overtaxes the stomach. Nursing the baby from both breasts because the mother "thinks" she has little or nothing in her breasts again overloads the stomach. The baby should make this decision—not the mother.

Occasionally mother's milk has too high a fat content. This condition is helped by restricting the nursing time, reducing fat in the mother's diet, and getting the mother to exercise a little. Organic causes, too, may be a factor in vomiting of the breast fed baby. Pylorospasm, pyloric stenosis, atresia of the duodenum, cerebral irritation, and many other organic diseases must be considered.

Constipation in the Breast Fed Baby.—The most common cause of this disturbance is a spastic anal sphincter. The usual story is "he strains and strains when he is trying to have a bowel movement and then when he finally has a movement it is soft and pasty and not hard and formed." Fissure in ano, which is frequently associated with this complaint, has the same story except that the first portion of the movement may be formed and hard, have a blood speck or streak along the outer portion of the stool and the baby cries when having a bowel movement. The treatment is simple, if a fissure is not present, daily digital dilatation by the mother usually suffices to cure the complaint. If a fissure is present, then in addition to the dilatation some bland oil should be inserted into the rectum daily—about an ounce to be retained.

Constipation in the mother may also manifest itself in the baby. Therefore, it should be corrected in the mother by dietary means and exercise and not by laxatives, because practically all laxatives taken by the mother will produce looseness of the bowels in the baby. Particularly is this true of phenolphthalein and cascara.

Constipation may also be caused if the baby vomits excessively as in pyloric stenosis or any other condition where not enough food passes into the intestinal tract. Insufficiency of breast milk may be a cause. This may be determined in a baby who is not gaining his 6 to 8 ounces of weight each week and who is "colicky."

The suppository habit will cause constipation. Suppositories produce their results by irritating the rectal mucosa. Ultimately the rectal mucosa becomes toughened and fails to respond to the mild stimulus of fecal matter. A saline enema—not soap suds—is a much better way of temporarily emptying the rectum.

Diarrhea in the Breast Fed Baby.—Overfeeding which results from feeding too frequently or permitting too long a feeding period when there is an overabundant supply may be determined when a baby is gaining 12 oz. to a pound a week. Such a condition may have diarrhea associated with it. The treatment, of course, is evident. Milk too high in fat may result in diarrhea of the baby. Here, again, shortening the nursing period is all that is necessary. Diarrhea in the infant is never an indication for weaning the baby from the breast.

Probably the most common cause of diarrhea in the breast fed is catharsis of the mother. Phenolphthalein which is in nearly all laxative pills, tablets, and oils, is secreted by the mother's milk and hence affects the baby. Many other laxatives act the same, such as cascara, castor oil and sometimes even the saline laxatives.

Supplemental foods may also upset the baby's intestinal tract. The mother or some other relative who feels that the baby isn't getting enough to eat from the breast may take it upon herself to feed the baby something additional, with the result that diarrhea is precipitated. Many times this information is not volunteered and only when the physician specifically inquires is it unearthed.

Changes in the breast milk may result from change in the physical condition of the mother. Even marked emotional disturbances may so change the mother's milk that the baby will subsequently develop diarrhea.

In a small infant parenteral infections will be associated with diarrhea very frequently. Consequently, every case of diarrhea in an infant should indicate the need for a thorough physical examination and signs of an upper respiratory infection, otitis

media, bronchitis, tonsillitis, etc. should be looked for. Treatment, of course, is directed toward clearing up of the infection.

So much for the breast fed baby. Insofar as the baby exclusively bottle fed is concerned, the aforementioned complaints apply equally as well, with the addition of a few more. The causes for acute vomiting may be summed up as follows: (1) Any undigestible food unfit for the infant, and (2) any of the acute infectious diseases.

Habitual Vomiting. — Regurgitation after each bottle has many causes. One of these is error in feeding technic, such as too rapid feeding, too slow feeding, and propping the bottle. The baby that is permitted to take 45 minutes to an hour to feed or the baby who has his bottle propped instead of being held by the mother will swallow too much air. This in turn causes vomiting and "colic." Handling and playing with the baby after he has been fed not only increases the possibility of the baby "spitting up" but also is physiologically incorrect. When the stomach is full, its blood supply has been increased greatly. This markedly increased gastric blood supply results in a partial depletion of cerebral blood and the baby normally should sleep after a feeding. On the other hand, playing with the baby after feeding stimulates him and increases the cerebral blood supply at the expense of the stomach, causing faulty gastric function.

Vomiting may also be caused by the inability of the baby to handle the fat or sugar in the formula. In addition to the vomiting, the stools are likely to be either gray, dry, or sandy or else be frequent, acid, sour, and pale.

Overfeeding in quantity or quality may be the cause of habitual vomiting or regurgitation. For example, a baby of 2 months of age may be taking 7 or 8 ounces of a formula composed of part milk at one feeding, while another baby of the same age is taking but 4 ounces at each feeding, but the formula is composed of almost whole milk. Both of these babies may regurgitate their food—the one because it is taking entirely too large an amount and the other because the formula is too rich or "heavy."

Pylorospasm and pyloric stenosis are organic causes that are associated with recurrent vomiting. Central or cerebral irritation resulting from birth trauma may also be an organic factor.

One could not discuss vomiting in the infant without at least briefly mentioning the hypertonic infant. This is the true "colicky" baby. He cries constantly, day and night. His food is regurgitated repeatedly regardless of what formula or food is tried. Invariably, these babies have been on every dietary regime by the time the pediatrist sees them. The story is always the same—nothing seems to agree with him, he continues to "spit up" and cries incessantly. He is tense, his joints are not as freely movable as those of the normal infant. He is not spastic as is the hemiplegic or spastic paraplegic, but he is hypertonic. Atropine sulfate in 1:1000 dilution—1 drop before each feeding—is a specific for these conditions, so much so that if a trial of atropine does not stop the vomiting, the infant is not hypertonic and another cause for the vomiting should be sought.

Constipation in the Bottle Fed Baby—Like vomiting, constipation has many causes which can and should be eliminated. There is no excuse for the daily administration of milk of magnesia, enema, or suppository.

Insufficient sugar in the daily formula is a common cause of constipation in the bottle fed baby. As you know, a baby under 10 pounds in weight requires 1 ounce of sugar daily and one over 10 pounds requires 1½ ounces. When these amounts are not given, constipation results because the intestinal tract, due to the insufficient carbohydrate fermentation, becomes alkaline. In the presence of an alkaline medium the excess fatty acids combine with calcium of the calcium caseinate (the curd which is 85 per cent of the protein) and form calcium soaps, causing hard, dry, sandy stools. All that is necessary in these cases, as a rule, is to increase the sugar or carbohydrate to its proper proportion and the constipation clears up.

Sometimes, however, the sugar is adequate and still the stools are hard, dry, gray, and marble-like. This indicates faulty fat utilization and a diet low in fat is advisable.

Occasionally an excess of sugar in the diet results in constipation (as a rule it causes diarrhea). The mechanism here is that the sugar requires water as it is absorbed from the intestinal tract. Consequently a large amount of sugar will require a large amount of water which is absorbed from the intestinal tract resulting in firmer, more compact stools.

Constipation may result because of the use of an unsuitable sugar. Some sugars are more readily absorbed than others. Thus, glucose is absorbed in the stomach whereas the dextrin-maltose preparations pass further along the intestinal tract before they are absorbed. And yet others, such as lactose and molasses, pass well along the intestinal tract, permitting considerable fermentation and bacterial growth with its intestinal irritation and so become much more laxative than the more readily absorbed sugars.

Underfeeding in quality or quantity will cause constipation. Excessive vomiting or lack of appetite causes constipation because insufficient food gets into the intestinal tract. Suppositories and cathartics, of course, encourage constipation. Organic causes such as fissure in ano, polyps, spastic anal sphincter, intestinal bands and kinks, etc. must always be considered when the dietary regime has been studied adequately.

Diarrhea in the Bottle Fed Baby.—If one were to consult the average textbook on pediatrics to try to learn something about diarrhea in the infant, one would have to read through page after page of material. In the end, the reader would probably be more confused than in the beginning. This is so because the subject of diarrhea is extensive and many factors must be considered in trying to arrive at the cause and deciding on proper treatment. However, in the great majority of cases the cause will fit into one of the following categories: intestinal indigestion, infectious diarrhea, parenteral diarrhea, organic causes.

By intestinal indigestion is meant the diarrhea resulting from improper handling of fats, carbohydrates, and proteins. It usually occurs in babies under 6 months of age. If it is a fat or carbohydrate indigestion, the stools will be watery, acid, and sour smelling. They will be green, greenish yellow, or white with much mucus. They will vary from six to twenty per day. The baby's buttocks will be scalded and irritated from the frequent acid stools. On the other hand, if it is a protein indigestion resulting from a formula too concentrated for the age of the

(Continued on page 447)

THE JOURNAL OF THE
AMERICAN OSTEOPATHIC ASSOCIATION

Published monthly by the American Osteopathic Association

Publication Office, 100 S. Kenilworth Ave., Oak Park, Ill.
Editorial Office, 139 N. Clark St., Chicago 2, Ill.
Address all communications to the Chicago Office

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Subscription . . . . . Ten dollars a year in advance

Vol. 46 April, 1947 No. 8

COMMENT ON HOSPITAL LICENSING

Among the more trenchant and analytical editors of the country are those whose comments are published in the *Fort Worth Star-Telegram*. The paper seems unusually knowledgeable on matters having to do with public health. Not everyone interested in health will agree with all the conclusions of the paper, but none will dispute the fact that its writers are uncommonly well informed upon the facts in case.

In this connection, a recent editorial on a hospital licensing bill of the type now prevalent in many state legislatures, brings out certain aspects of the hospital situation which, if they have been published elsewhere, have escaped our attention.

R. C. McCAUGHAN, D.O.

The public health committee of the State Senate deserves commendation for sending the Morris hospital licensing bill (S. B. 29) to a subcommittee for further study. It is doubtful whether any amount of study would reveal any real merit in the bill, or show any need for its passage.

Apparently oblivious to the fact that the American people are fed up on government regulations and bureaucratic control of their affairs, sponsors of this bill seek the creation of still another state agency which would be clothed with dictatorial powers over all hospitals in the state.

Purpose of the agency would be to license, inspect and regulate hospitals and related institutions. The bill in question defines the powers of this new agency, sets up enforcement procedures and penalties and, of course, authorizes an appropriation to cover its expenses.

Under the terms of the bill, no new hospital could be established in the state without first obtaining a license. Existing hospitals would be given "a reasonable time, not to exceed one year," within which to comply with the rules and regulations and minimum standards authorized by the law.

It is worthy of note that the "rules and regulations and minimum standards" authorized by the law are not set forth in the bill. The bill merely delegates to the State Board of Health authority to "adopt, promulgate and enforce" such rules, regulations and standards.

The bill also creates a hospital advisory council of 12 members who are to receive no salary "but shall be reimbursed for actual expenses incurred in the performance of the duties of their offices." These duties are to consist of consulting and advising with the State Board of Health and reviewing and recommending the rules, regulations and standards authorized by the act.

The necessity of maintaining high standards of hospital care is not questioned. But it does not follow that a hospital licensing law is needed. Adequate laws for the safety and sanitation of hospitals already are on the statute books. Enforcement of these laws does not require that any man, or group of men, be given dictatorial power to force out of business any hospital which did not or could not measure up to the prescribed regulations and standards.

Proponents of the bill may argue that the legal rights of hospital owners and administrators are fully protected by that section of the measure giving those denied licenses the right of appeal to the courts. The right of judicial review is granted by the bill, but the same section which grants this right so restricts the jurisdiction of the courts as to make the right of appeal all but meaningless.

The bill provides that "findings of fact by the State Board of Health shall be conclusive unless substantially contrary to the weight of evidence." This is the rule of "substantial evidence" which was conceived in the fertile brain of some ardent bureaucrat in Washington to place the arbitrary rulings of bureaucrats effectively beyond the reach of the courts. It is the rule that sets bureaucrats right up in business by making them not only administrators of a law but judge, jury and prosecutor of those subject to the law.

Suppose a district court does find that the findings of fact by the State Board of Health are substantially contrary to the weight of evidence. What then? Can the court reverse the board's ruling denying a license to an applicant? Indeed not. The court, under the terms of the bill, can do nothing more than "remand the case to the State Board of Health." The bill also provides that the State Board of Health *may* thereupon make new or modified findings of fact which "shall likewise be conclusive unless substantially contrary to the weight of the evidence." That simply would leave applicants denied licenses exactly where they were in the first place—right back of the eight ball.

This proposed grant of autocratic power to the State Board of Health and the Health Advisory Council offers no serious threat to the larger hospitals of the state. They possess the facilities and the financial resources to provide whatever equipment might be required by the state board as a prerequisite to licensure. But it would place dozens of small hospitals in the rural districts in real jeopardy.

It has been represented at Austin that enactment of a hospital licensing bill is essential if Texas is to share in the federal aid hospital construction program which has been authorized in Congress.

That simply is not true. There is not one word in the federal law authorizing the hospital program requiring any state to license its hospitals in order to qualify for its share of the money.

The states are required to "provide minimum standards . . . for the maintenance and operation of hospitals *which receive federal aid.*" It may be true that some new legislation will be needed if Texas is to receive its share of the federal aid funds, but it is clear that such legislation need concern itself only with those hospitals which hope to get some of the federal money.

The prospect of getting some federal aid should not be used as an excuse for enacting an unnecessary law which might operate to the disadvantage of the smaller hospitals which already are established and rendering a valuable health service to their communities.

The federal law designates the surgeon general of the United States Public Health Service as the chief administrator of the federal-aid hospital construction program. It is no secret that the USPHS frowns on small hospitals. The service's Bulletin No. 292 contains this statement of policy: "Good administration dictates that, except in unusual situations, state plans preclude approval of any project for a hospital of less than 50 beds."

Such a requirement may be all right for new hospitals which are to be erected with federal aid. But there are many rural communities which can neither build nor maintain

50-bed hospitals. Dozens of these communities now have good hospitals with much less than 50 beds, some of them as few as 10, 15 or 25 beds.

If these should be forced out of business through a state licensing system, the result would be to compel patients requiring hospitalization to patronize hospitals in the larger cities and these, in many cases, would be considerable distance from the homes of the patients.

Such a result would be directly contrary to one of the main purposes Congress had in mind in authorizing federal aid for hospital construction. Section 622 (d) of the federal aid act recognizes the relatively greater need for hospitals in rural areas and requires states, in determining the priority of projects, to give special consideration to the needs of such areas.

This requirement of special consideration of the needs of rural areas will benefit only those rural areas capable of supporting hospitals of at least 50 beds. It should not operate to deprive communities of the smaller hospitals which they already have, or which they might acquire in the future without financial aid from Washington.—*Fort Worth Star-Telegram,* March 9, 1947.

IT CAN BE DONE AND IS BEING DONE

Recent statistical reports of the results of the work of the Osteopathic Progress Fund Committee and its many leaders and workers throughout the country are significant and encouraging but by no means good enough. Osteopathic colleges need about seven and one-half million dollars in income, over and above tuitions and student fees, in approximately the next 5 years. About 12.3 per cent (more than $921,000) of that is pledged and a goodly sum has been collected. Pledges in previous efforts of organized osteopathy have proved to be almost 100 per cent collectible. So the effort proceeds albeit all too slowly. Some have contributed generously. Some on a magnificent scale. Too many, however, have neglected to do their part.

Keeping up-to-date records of gifts is difficult since reports come to this Association from each college and divisional society. It is an intricate business, that of justly crediting and recording every donor, his divisional society, and the institutions to which contributions have been made. But after much effort a better system is in operation. The profession can begin to understand how its members in various areas are reacting to their responsibilities.

Whenever (and may it be soon) the rank and file of doctors of osteopathy wake up to the needs of osteopathic schools, to the importance of the educational processes to the continuity of the profession collectively and individually, to the improvement of the service which doctors of osteopathy render to those they serve, all inherent in a better educational process, the profession will take measures to see that osteopathic colleges are well supported.

Osteopathic physicians have demonstrated both willingness and ability to do a good job in the past, even though many busy members were slow to realize the need. Back in 1933, just as new methods began to be introduced into osteopathic representative organizations, the membership of A.O.A. ran as low as 3,300. Steadily, since then, practically without interruption, divisional societies and the American Osteopathic Association have enjoyed increased support from the profession. More members have joined together with their fellows to do organizational work. Increased dues have not been a deterrent. The contrary is true. Organizational possibilities are beginning to be understood by the doctor in the field. The 1947 Directory now on the press will show the largest membership on record in this Association and the largest total membership in divisional societies. It took a long time to clarify the necessities and the possibilities for success of good organization.

And so we have a precedent. We have learned something of our characteristics as a profession. We may have been slow on the uptake, unduly deliberate in our decisions, a little reluctant to give the time, the attention, and the money to build up good organization. But since we have more recently demonstrated ability along necessary lines we will, at long last, recognize the possibilities for good in the successful prosecution of the campaign to finance the half dozen osteopathic colleges.

Let no one believe the task impossible. Cold arithmetic speaks too plainly. The members of the profession are not for long under the necessity of supplementing, from their resources alone, the deficit in the costs of maintaining osteopathic colleges at a higher level, but—the profession could do so, and could very well afford to do so, if that were necessary. Everyone who has tried with ordinary persistence and acumen to invite the assistance of the philanthropically inclined public has met with reasonable success. The D.O. well informed as to the needs of the colleges and the use to which donors' funds will be devoted can, sooner or later, attract gifts for osteopathic colleges.

A very large proportion of the hospitals in the country were built from funds left by big and little donors—funds given, let it be emphatically noted, because physicians asked for those gifts in no uncertain terms. The doctors said politely, considerately, but firmly and repeatedly, "the need is here—your money will satisfy the need—give liberally and now." And many of those who could give did so. The result is obvious the country over.

Osteopathic colleges are doing a magnificent job. That is the opinion of those who have been carefully selected by the profession to study these institutions year after year. It is the opinion of many educators outside the profession who have had opportunity to examine them. It is even the growing opinion among those in a rival profession who have perennially exhibited prejudice in the purest sense of the term in respect to the educational background of the osteopathic physician.

Machinery is set up to carry to a successful conclusion the financing of osteopathic colleges. That it is workable has been demonstrated. A large amount has been contributed to the schools in the last 3 years. Much is pledged to be paid within the next several years. All that is needed is the assumption of responsibility, inescapable by every D.O., to make his personal pledge and contribution and to ask others in and out of the profession to do the same, not forgetting the rewards of success.

R. C. McCaughan, D.O.

DR. ARTHUR D. BECKER

In the death of Dr. Arthur D. Becker, aged 68 years, on March 16 at St. Petersburg, Fla., the osteopathic profession lost not only one of its most distinguished physicians, but also a man who had given a lifetime of service to organized osteopathy.

Physician, writer, teacher, administrator—Arthur Becker grew up with osteopathy—one of those pioneers who guided the destinies of this young and vigorous science. Its struggles for survival, recognition, advancement, were his struggles. Its triumphs and defeats were his to rejoice in or to worry over because he was one of those who shared prominently in the plans for the profession. Throughout the years he worked continually for higher educational standards of osteopathic colleges. He knew that therein lay the basis for the very existence of osteopathy. He lived to see the attainment of these objectives and the launching of the Osteopathic Progress Fund to maintain those educational heights. Failing health prevented him from actively participating in this campaign, but his heart was in it and his counsel frequently sought.

Dr. Becker led a busy and fruitful life. Responsibilities were thrust upon him at an early age, which conditioned him for the tremendous tasks which followed when he reached maturity.

He was born in Austin, Minn., on August 20, 1878. When he was 12 years old, his father died and the elder son was forced to go to work to support his mother, younger brother and sisters. A high school education was obtained by private tutoring paid for out of his own small earnings. He became interested in osteopathy and entered the S. S. Still College of Osteopathy, Des Moines, Iowa, graduating in 1903.

Following graduation Dr. Becker went back to Minnesota and carried on a general country practice for 5 years in Preston, a town of 1200 inhabitants. There he gained an intimate knowledge of human misery and what osteopathy could do to relieve it. He was called upon to care for a wide variety of ailments, from teething of babies to virulent smallpox. On October 17, 1906, he married Mabel Rollins.

Feeling the need of postgraduate work, he spent a year at the American School of Osteopathy, Kirksville, Mo., and at the completion of his course was prevailed upon to stay and assist in the teaching of the principles and practice of osteopathy. During this time he became a close friend of Dr. Andrew Taylor Still, the founder.

In 1911 Dr. Becker returned to general practice, first at Preston and later at Minneapolis. His organizational and executive ability became apparent to other members of the profession and in 1912 he was elected President of the Minnesota Osteopathic Association. He served another term as president in 1916.

The Governor of Minnesota appointed him to the State Osteopathic Examining Board in 1913 in which capacity he served for 9½ years.

When the A. T. Still College of Osteopathy and Surgery was organized by Dr. George M. Laughlin in 1922 at Kirksville, Mo., Dr. Becker was appointed dean and professor of theory and practice of osteopathy. He held this position for 4 years, resigning to engage in general practice in Seattle. In 1928 he was again called back to Kirksville, this time as vice president and professor of osteopathy and diagnosis of the present Kirksville College of Osteopathy and Surgery.*

Dr. Becker's long service to the American Osteopathic Association began in 1913 when he was elected a trustee for 3 years. In 1927 he was again elected to a trusteeship and until 1930 when he was elected first vice president, served on many bureaus and committees of the A.O.A., including the Bureau of Hospitals, the Bureau of Professional Education and Colleges, the Committee on Finance and others. He was also president of the Associated Colleges of Osteopathy in 1930-31.

At the annual convention in Seattle in 1931 Dr. Becker became the thirty-sixth president of the American Osteopathic Association and presided over the annual meeting in Detroit the following summer. During his incumbency an extensive reorganization of the Association was well commenced. In the year following his presidency, he continued very active in the work of the Executive Committee and was one of those who helped form the National Board of Examiners for Osteopathic Physicians and Surgeons.

In 1933 he was reelected to the Board of Trustees and again in 1936. Including his terms as vice president, president, and past president, Dr. Becker served a total of 15 years on the Board of Trustees of the A.O.A.—truly a remarkable record in the service of organized osteopathy.

On July 1, 1935, Dr. Becker became president of the Des Moines Still College of Osteopathy and served in that capacity for 7 years. During his tenure of office he was elected a second time as president of the Associated Colleges of Osteopathy.

In 1942 Dr. Becker resigned as president of the Des Moines College and returned to practice, specializing in cardiology. He divided his time between Lake Orion, Mich., and St. Petersburg, Fla. He earned a specialist's certificate from the American Osteopathic Board of Internal Medicine and in 1944 was elected president of the American College of Osteopathic Internists.

Many honors came to Dr. Becker during his lifetime. He received an honorary Bachelor of Science degree from the Kirksville College of Osteopathy and Surgery in 1925 and an honorary Doctor of Science in Osteopathy degree in 1938 from the same college. In 1941 the American Osteopathic Association awarded him the Distinguished Service Certificate "for osteopathic education and college administration; osteopathic organization and literary activities." In 1944 Dr. Becker received another honorary degree, this time Doctor of Science in Osteopathy, from the College of Osteopathic Physicians and Surgeons, Los Angeles. This occurred at the time he was giving the first of a series of "Still Lectures" on osteopathic principles and practice at the Los Angeles college.

Throughout the years Dr. Becker was in constant demand for speaking engagements, not only on scien-

*American School of Osteopathy and A. T. Still College of Osteopathy and Surgery combined in 1924 to form the Kirksville College of Osteopathy and Surgery.

tific subjects for state and district osteopathic meetings, but also on topics of interest about osteopathy to service clubs and other lay groups. A national program was not complete without Dr. Becker's name among the stellar attractions. He was a gifted writer and THE JOURNAL published many of his papers.

He was at one time president of the Kiwanis Club of Minneapolis. He was a Mason, a member of the Atlas Club, and an honorary member of two other fraternities, Acacia and Alpha Tau Sigma.

He is survived by his wife, a sister, Dr. Ethel Becker of Ottumwa, Iowa, a brother, Walter Becker, Ottumwa, Iowa, two sons, Dr. Rollin E. Becker of Pontiac, Mich., and Dr. Alan R. Becker of Jackson, Mich., and four grandchildren. Burial was in Austin, Minn.

The career of a distinguished osteopathic physician, author, teacher, and administrator has ended. He will be remembered as one of those few individuals who contributed most to the raising of osteopathic educational standards through the years when osteopathy was struggling against great odds. He gave a lifetime of service to organized osteopathy. He did his work and he did it well. Humanity is better because he lived.

R. E. D.

DR. RAY B. GILMOUR

On March 5 another past president of the American Osteopathic Association died—Dr. Ray B. Gilmour—at the age of 60 years. He had practiced osteopathy in Sioux City, Iowa, for nearly 40 years and had a long and distinguished record of service not only in the national, but also in his state association.

Dr. Gilmour was born February 27, 1887, at Blackfoot, Idaho. He graduated from the American School of Osteopathy, Kirksville, Mo., in 1909. Very early in his career he took active part in organizational work and in 1918 was elected secretary-treasurer of the Iowa Association of Osteopathic Physicians and Surgeons, which position he held for 10 years. He was also appointed a member of the first Iowa State Board of Osteopathic Examiners in 1921 and served continuously for more than 5 years.

In 1921 he was elected for the first time as a trustee of the American Osteopathic Association and appointed chairman of the Department of Education. In 1924 he was re-elected a trustee and headed the Department of Professional Affairs. He became first vice president in July, 1925, and was elected president in 1926. After serving on the Executive Committee as president and past president, he was re-elected a trustee for 3 years beginning in 1928 and held the chairmanships of the Department of Professional Affairs and Bureau of Professional Education and Colleges.

He served as president of the Fifth District and Sioux City associations and in 1929 was elected president of the Iowa state association. That same year he received a Distinguished Service Certificate from the American Osteopathic Association. At the time of his death he was a trustee of the Iowa association.

Dr. Gilmour was active in Boy Scout work in Sioux City for over 30 years and was chairman of the boys work committee of Rotary International. He was a past president of that club and also a member of Tyrian lodge, 508, A.F. & A.M., Sioux City Consistory, AbuBekr shrine, and the Unitarian church. He was a past president of Theta Psi, osteopathic fraternity.

The Fifth District, Iowa Society of Osteopathic Physicians and Surgeons, passed the following memorial resolution at a meeting March 16, 1947:

"There is joy in living. There is inspiration in human relationships. There is privilege in service to our fellow man. The career of Dr. Ray B. Gilmour exemplified all these. His was a full life. He was intensive and zealous. He was a leader. His sense of responsibility was unique. He was stedfast in his devotion to the welfare of his patients and to the interests of his profession. He was never too busy to lend a helping hand. His virtues may well be emulated.

"The course of human destiny is inevitable. In the midst of life we are faced with death. We pause to pay homage to our departed friend and fellow physician.

"Ray Gilmour carried on through months of intermittent suffering, with seldom an audible complaint. Death struck suddenly. It was undoubtedly as he would have wished. It is difficult to realize he is gone. We have lost a true friend, an ardent colleague, and a most worthy member of our profession. He will be sorely missed.

"NOW, THEREFORE, BE IT RESOLVED, that we, the members of the Fifth District, Iowa Society of Osteopathic Physicians and Surgeons, and the Auxiliary hereof, in sorrow assembled, this 16th day of March, 1947, to honor the memory of our departed friend and associate, Dr. Ray B. Gilmour, do keenly deplore his untimely demise, and humbly extend our sincere sympathy to his widow, and to the surviving members of his family."

R. E. D.

DR. JOHN A. MacDONALD

As we go to press word is received of the death of another past president, Dr. John A. MacDonald, Boston. A commemorative editorial will appear in the May JOURNAL.

THEME FOR 1947 CONVENTION

"The Place of the Osteopathic Concept in the Healing Art"

Stevens Hotel, Chicago
July. 21-25, 1947

National Convention—Chicago

CONVENTION TRANSPORTATION

It is time to be thinking seriously about transportation reservations to Chicago for the Fifty-First Annual Convention of the American Osteopathic Association, to be held at the Stevens Hotel, July 21 to 25 inclusive.

While travel conditions have greatly improved during the past year and it is much easier to get accommodations now than during the war years, it is still important to make arrangements early. There will be heavy vacation travel during the convention period. In order to get the type of reservations desired at the proper time, it is important to make them as early as the transportation lines will accept them.

We offer the rates from principal points in the country by way of rail, bus, and air lines. There are no other special rates or concessions, except for large parties who charter a plane, bus, or pullman car. See your nearest agent for the best routes and rates.

RAILROAD FARES

Herewith is a list of both rail and pullman fares from various cities to Chicago. Tourist accommodations can be used for those traveling from the west and northwest. Tourist fares are slightly lower in cost for both rail and pullman. Round trip tickets are good for 90 days, with all stopover privileges.

Round trip rail fares to Chicago from:

	COACH	FIRST CLASS	LOWER (one way)
Atlanta, Ga.	$29.50	$39.45	$ 6.40
Boston	33.85	60.85	7.85
Buffalo	17.60	32.85	4.35
Cincinnati	11.75	19.00	2.95
Cleveland	13.35	22.45	2.95
Dallas, Tex.	37.80	47.25	8.10
Denver	41.05	51.30	8.45
Des Moines, Ia.	14.25	17.75	2.95
Detroit	11.35	18.35	2.95
El Paso, Tex.	55.55	69.45	11.90
Indianapolis	7.85	12.05	2.95
Jacksonville, Fla.	43.05	58.25	9.25
Kansas City, Mo.	18.20	22.75	3.50
Los Angeles	71.50	99.35	18.25
Louisville, Ky.	11.90	19.40	2.95
Memphis, Tenn.	22.00	28.05	4.35
Miami, Fla.	56.90	77.50	11.90
Minneapolis	16.15	20.15	2.95
New Orleans	37.25	49.80	7.85
New York	30.00	54.00	6.95
Pittsburgh	16.65	29.50	3.50
Portland, Ore.	71.50	99.35	18.25
Raleigh, N. C.	29.95	52.85	8.10
Salt Lake City	59.15	73.95	11.90
San Francisco	71.50	99.35	18.25
Seattle	71.50	99.35	18.25
Washington, D. C.	25.30	46.45	6.40
Montreal	32.70	52.55	6.95
Quebec	41.50	62.70	7.40
Toronto	19.65	31.85	2.35
Vancouver	71.50	99.35	18.25
Winnipeg	32.85	41.00	6.40

The present 15 per cent Federal transportation tax is not included.

AIR TRAVEL

Air transportation will enable members to reach Chicago in a matter of hours from most cities and in less than half a day from East, West and Gulf coastal points.

This year doctors will be able to make their air trip in four-engined high-speed planes now being operated by all major air transportation companies. In addition, many key cities will be linked with Chicago by new postwar luxury planes such as United Air Lines' Mainliner 300's (Douglas DC-6). These giant new four-engined planes, being introduced to the flying public for the first time this spring, have pressurized cabins for lower level comfort at high operating altitudes and travel at better than 300 miles an hour.

Following is a list of typical fastest plane times to Chicago from various cities and the round trip fares. All fares are subject to Federal tax.

TO CHICAGO FROM	FASTEST PLANE TIME	ROUND TRIP FARE
Atlanta, Ga.	3:00	$ 65.70
Boston	5:05	87.30
Cleveland	2:05	31.40
Dallas, Tex.	4:10	91.60
Denver	3:11	90.80
Detroit	1:35	25.20
Kansas City, Mo.	1:50	41.50
Los Angeles	7:50	188.00
Miami, Fla.	5:30	129.80
Minneapolis	1:55	32.30
New Orleans	5:36	89.90
New York	3:20	72.30
Omaha	2:15	43.30
Portland, Ore.	8:32	188.00
St. Louis	1:25	25.80
San Francisco	6:35	188.00
Seattle	9:47	188.00
Washington, D. C.	2:58	60.00

ROUND TRIP BUS FARES TO CHICAGO

Akron, O.	$10.35	Jackson, Miss.	$22.70
Albany, N. Y.	21.80	Kansas City, Mo.	13.45
Atlanta, Ga.	19.45	Knoxville, Tenn.	15.25
Baltimore	21.80	Little Rock, Ark.	19.75
Boston	24.90	Los Angeles	61.75
Buffalo	14.80	Louisville, Ky.	9.40
Cincinnati	8.55	Memphis, Tenn.	15.75
Cleveland	9.55	Miami, Fla.	35.55
Columbus, O.	8.75	Minneapolis	11.90
Dallas, Tex.	25.75	Nashville, Tenn.	13.35
Dayton, O.	8.30	New Orleans	24.40
Denver	33.25	New York	21.80
Des Moines, Ia.	11.45	Norfolk, Va.	24.50
Detroit	7.65	Omaha	16.40
El Paso, Tex.	41.50	Philadelphia	21.80
Erie, Pa.	12.35	Pittsburgh	13.15
Flint, Mich.	7.95	Portland, Ore.	61.75
Fort Worth, Tex.	25.75	Rochester, N. Y.	16.60
Grand Rapids, Mich.	5.85	St. Louis	8.10
Harrisburg, Pa.	20.45	Salt Lake City	46.40
Hot Springs, Ark.	20.70	San Francisco	61.75
Houston, Tex.	30.25	Seattle	61.75
Indianapolis	5.60	Toledo, O.	6.70
Iowa City	7.30	Washington, D. C.	21.80

MOTORING

Those who motor may wish to take advantage of the free travel service offered by some of the oil companies. They will outline the best routes and send maps. Address: Conoco Travel Bureau, 1755 Glenarm Street, Denver, Colo., or Texaco Touring Service, 332 South Michigan Avenue, Chicago 4, Illinois.

GREAT LAKES TRIPS

Those wishing to take a vacation lake cruise before or after the convention should make their arrangements now to avoid disappointments later. Literature, information, reservations, and tickets may be obtained from Great Lakes Cruise Bureau, 7 South Dearborn Street, Chicago 3, Illinois. Round trip railroad tickets are honored on the steamers for transportation. Charges for staterooms and meals are extra.

CLAYTON N. CLARK, D.O.

ANNUAL CONVENTION INVITATIONS

In relation to the formal invitation to this Association to hold an annual convention in a particular place, the Constitution of the American Osteopathic Association was amended at the 1939 convention to provide that "the House may take action covering not more than two succeeding conventions." Therefore, it will be possible, but not mandatory, for the House of Delegates at the 1947 convention in Chicago to select the convention city for 1949. (The 1948 convention is already assigned to Boston.)

Formal invitations must be received not less than 60 days before the convention and in such invitation the inviting city is required to give detailed description of physical facilities available and of a local organization now set up or to be set up. This descriptive information is an essential part

of the convention invitation, and failure to provide it will bar consideration of the invitation by the Convention City Committee and by the House of Delegates. The Convention City Committee is composed of Stephen M. Pugh, Chairman, Louis H. Logan, M. Carman Pettapiece, C. N. Clark, and R. C. McCaughan.

Following are the formal rules involved:

"The invitations shall be received not less than 60 days before the time of selection of convention city so that plenty of time may be offered to investigate. Inviting cities shall in their invitation give detailed description of physical facilities and of their local organization. These descriptions shall be exact and failure to provide this information to the Committee shall bar consideration of the invitation by the Committee and the House of Delegates.

"The Committee shall report its findings, recommendations, and reasons therefor to the Board and the House of Delegates early in the annual sessions each year so that adequate time can be had for discussion before decision is arrived at on location by the House. The House shall give serious consideration to the recommendation of the Committee. The Committee may recommend one city or more than one if two alternatives seem equally acceptable. In selecting convention city for recommendation the Committee shall consider the following factors listed in the order of their importance:

(a) Physical facilities for general and sectional and affiliated groups' programs, and for housing attendants.
(b) Location of city for drawing the largest attendance.
(c) Clinical facilities (legal status of profession).
(d) Location of city as a drawing card for exhibitors.
(e) Physical facilities as a drawing card for exhibitors.
(f) Expense to the Association in putting on convention.
(g) Intra-professional good will promotion, here considering location and success of previous convention.
(h) Public relations of the profession.
(i) Ability of the local group to provide necessary local committee.
(j) Available entertainment for members' families.

"Divisional societies or associations extending convention city invitations shall be requested to give detailed description of physical facilities of their city and their local organization. All such communications shall be presented to the Convention City Committee not less than 60 days before the time of selection of the convention city."

R. C. McCAUGHAN, Executive Secretary.
Chairman, Bureau of Conventions.

Proposed Amendments to the Constitution and Bylaws of the American Osteopathic Association

R. C. McCAUGHAN, D.O.
Executive Secretary

(References to articles, sections, lines, etc., are to the edition of the Constitution and Bylaws in the Directory of Osteopathic Physicians, 1947, published by the Association.)

BYLAWS

(The following amendment is proposed by John W. Mulford, Chairman of the Committee on Extension of the House of Delegates.)

Article IV—Delegates: Methods of Election and Duties

Amend Section 1 by inserting in the first paragraph of that section after the words, "House of Delegates," the words, "and not again, for Delegate selection purposes, until 60 days before the next annual meeting of the House of Delegates."

Further amend Section 1 by adding, as the last sentence of the second paragraph of that section, the words, "Such Delegates (and their Alternates) shall serve during the annual meeting of the House of Delegates and during the interim between annual meetings or until their successors are elected."

Section 1, as proposed to be amended, would then read:

"The Executive Secretary of this Association shall furnish to the secretary of each divisional society 60 days before the first day of the annual meeting of the House of Delegates, *and not again, for Delegate selection purposes, until 60 days before the next annual meeting of the House of Delegates,* a statement of the number of regular members of this Association located in the territory represented by that divisional society.

"Based on that statement, each divisional society shall select, in a manner prescribed by its Constitution and Bylaws, the number of Delegates (and their Alternates) to the House of Delegates of this Association to which said divisional society is entitled under the provisions of the Constitution of the American Osteopathic Association. The secretary of each divisional society shall certify its Delegates to the Executive Secretary of this Association in writing or by wire, at least 15 days prior to the first day of the annual meeting of the House of Delegates. *Such Delegates (and their Alternates) shall serve during the annual meeting of the House of Delegates and during the interim between annual meetings or until their successors are elected.*

"Such Delegates and Alternates must be regular members in good standing of this Association and of the divisional societies which they represent."

(The following amendment is proposed by John W. Mulford, Chairman of the Committee on Extension of the House of Delegates.)

Article IV—Delegates: Methods of Election and Duties

Amend Section 4 by inserting after the words, "divisional society," in line seven, the words, "as certified to, 60 days before the annual session of the House of Delegates, under the requirements of Section 1 of this article."

Section 4, as proposed to be amended, would then read:

"Each Delegate from a divisional society, provincial or foreign association shall have one vote in the House excepting only when one-fourth of the members present shall call for the yeas and nays on any question, in which event the Secretary shall, before any other motion can be made, call the roll by divisional, provincial or foreign societies and enter the yeas and nays in the record. In recording such vote each divisional society shall be given one vote for each twenty regular members of the American Osteopathic Association located in the territory represented by that divisional society, *as certified to, 60 days before the annual session of the House of Delegates, under the requirements of Section 1 of this article,* and such votes may be cast by any one of the delegation then seated or divided among the various members of the delegation as the delegation in caucus shall decide."

(The following amendments are proposed by John W. Mulford, Chairman of the Committee on Extension of the House of Delegates.)

Article IV—Delegates: Methods of Election and Duties

Amend Section 1 by striking out, following the comma in the second line, the words, "at least," and by inserting, following the comma in the third line, the words "and not again until 60 days before the next annual meeting of the House of Delegates."

Amend Section 4 by inserting, following the comma in the seventh line, the words, "as certified to 60 days before the annual session of the House of Delegates under the requirements of Section 1 of this article."

Amend Section 1, by striking out, following the comma in line two, the words, "at least 60 days before the first day of the annual meeting of the House of Delegates," and inserting in lieu thereof the words, "annually on the first day of May."

Amend Section 1, by adding as the last sentence of the second paragraph of that section, the following: "Such Delegates (and their Alternates) shall serve during the annual meeting of the House of Delegates and during the interim between annual meetings or until their successors are elected."

Amend Section 4 by inserting, following the comma in the seventh line, the words, "as certified to annually on the first day of May under the requirements of Section 1 of this article."

Department of Professional Affairs

BENJAMIN F. ADAMS, D.O.
Chairman
West Hartford, Conn.

ADVISORY BOARD FOR OSTEOPATHIC SPECIALISTS

LOUIS C. CHANDLER, D.O.
Chairman
Los Angeles

SPECIALTY BOARD EXAMINATIONS

American Osteopathic Board of Neurology and Psychiatry.—Examinations will be held in Chicago just before the Annual Meeting of the American Osteopathic Association, July 21-25. Application must be filed 60 days prior to that date. Address the secretary, Thomas J. Meyers, D.O., 420 Security Bldg., Pasadena 1, Cal.

American Osteopathic Board of Ophtha'mology and Oto'aryngology.—Examinations will be held at the Statler Hotel, Detroit, July 17-19. Applications must be filed 60 days prior to that date. Address the secretary, T. J. Ruddy, D.O., 907 Pellissier Bldg., Los Angeles 36.

American Osteopathic Board of Pediatrics.—Examinations will be held in Chicago July 19, 9 to 12 A.M. Applications must be filed by May 15. Address the secretary, Dorothy Connet, D.O., Kirksville College of Osteopathy and Surgery, Kirksville, Mo.

American Osteopathic Board of Radiology.—Examinations will be held in Chicago at the time of the Annual Meeting of the American Osteopathic Association, July 21-25. Applications must be filed 90 days previous to the date of examination. Address C. A. Tedrick, D.O., 1550 Lincoln St., Denver 5, Colo.

American Osteopathic Board of Surgery.—The final date for filing of application in 1947 for examination for certification in General Surgery, Urological Surgery, Orthopedics, and Anesthesiology is April 1, 1947. Application blanks may be obtained by writing to the secretary, Orel F. Martin, D.O., P.O. Box 263, Coral Gables, Florida.

COMMITTEE ON SPECIAL MEMBERSHIP EFFORT

STEPHEN B. GIBBS, D.O.
Chairman
Coral Gables, Florida

ATTENTION MEMBERS-DELEGATES

We have appealed to all of you from time to time for help in obtaining new A.O.A. members. Many of you have cooperated very well and, thanks to your assistance, our membership continues to be on the increase.

Even under the present high membership total, however, we cannot find places in our budget for some of the important and greatly needed services of the A.O.A. We would rather not think of what might happen should a loss in membership occur in the near future. It just must not happen.

Our colleges must continue to grow. Members, you are the ones to make this possible by your own loyalty and by bringing those of our profession, who have caused you to foot their bills for so long, into active membership.

It has been suggested that a nonmember, making application to A.O.A. membership, be required to pay a penalty for each year of active practice as a nonmember prior to filing application. We are not quite sure how this would work out, but we would like to hear some more suggestions on how we are to obtain and hold our membership. We must have uninterrupted membership from every osteopathic physician.

1. Pay dues promptly.
2. Give more time trying to obtain new members from the slacker list.
3. Encourage young men and women of good character to enter our colleges.
4. Give to our fund-raising campaigns till it hurts—then wake up feeling better.

8,300 by June 1, 1947!!

S. B. G.

MEMBERSHIP REPORT AS OF MARCH 1, 1947

Membership count, February 1, 1947	7,806
Applications received in February, 1947	21
Graduates licensed	5
Names restored to roll	25
	51
Less: Deaths and dropped from roll, February, 1947	6
	45
Net gain in February, 1947	45
Total membership count, March 1, 1947	7,851

HONOR ROLL

Dr. Edward Abbott
Dr. Hazel G. Axtell
Dr. Robert D. McCullough
Dr. Robert Morgan
Dr. Charles W. Sauter
Dr. Walter H. Siehl
Dr. Helen Terhuwen

Department of Public Relations

CHESTER D. SWOPE, D.O.
Chairman
Washington, D. C.

NATIONAL SCIENCE FOUNDATION HEARINGS OSTEOPATHIC TESTIMONY

Congressional hearings were held on March 6 and 7, 1947, by the House Committee on Interstate and Foreign Commerce on bills proposing the establishment of a National Science Foundation. The bills, H.R. 942, H.R. 1815, H.R. 1830, H.R. 1834 and H.R. 2027, provide that the Foundation shall be an independent agency; support basic research; provide for the award of scholarships and fellowships in science to young men and women of outstanding ability, without attempting to limit the recipients to any field of scientific study, and without retaining any control over them after the completion of their studies; contemplate an internal structure for the Foundation composed of Divisions, each of which is to be concerned with a major field of science, including a Division of Medical Sciences, and permit additional divisions to be established when necessary or desirable; provide for an advisory committee of specialists to be attached to each division; provide for correlation of Government research activities; and provide for international cooperation in research, and for fostering the interchange of scientific information, both domestically and internationally.

The Secretary of War, the Federal Security Administrator, representatives of the Secretary of the Navy and the Secretary of Commerce, and witnesses from scientific groups appeared in support of the legislation. J. S. Denslow, member of the Research Board of the American Osteopathic Association, Director of Research of Kirksville College of Osteopathy and Surgery and Director of Research Laboratory of the Still Memorial Research Trust, appeared as a witness on March 7. The following is excerpted from Dr. Denslow's testimony:

"This mechanical age superimposes problems of injuries and disabilities of skeletal structures on prevalent imperfect body mechanics. In the report of the Subcommittee on Orthopedics and Body Mechanics of the 1931 White House Conference on Child Health and Protection, it was stated: 'We may reasonably believe that perhaps 75 per cent of the male and female youth of the U. S. exhibit grades of body mechanics which, according to the standards of this Subcommittee, are imperfect.'

"In spite of the considerable contributions which have been made by orthopedists, industrial surgeons and in the medical services of the armed forces, there still remains widely divergent opinions as to the exact nature of the conditions encountered and as to the nature of their influences on the human body.

"Recognizing that a fundamental understanding of the various abnormalties encountered would provide the only means of securing objective tests for measuring the effect of various therapeutic procedures, we have carried on research, the results of which have been published in the *Journal of Neurophysiology*, the *American Journal of Physiology*, the

Proceedings of the Society for Experimental Biology and Medicine, and in the JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION.

"We join in supporting this legislation, and offer the following observations for your consideration:

"At the undergraduate level it has been found that volunteer and paid student assistants make a real contribution to research projects. Their part in the research program ought to be expanded, but instead is diluted because of inadequate funds. Many preprofessional students have demonstrated an aptitude for work in biological sciences who cannot continue their education at the professional level because of lack of funds. Students in both categories should be assisted by scholarships.

"At the graduate level it is difficult, often impossible, to entice men and women of the proper caliber into research fields because of lack of funds. Substantial fellowships represent the only practical method of competing with the attractions of private practice where few scientific contributions are made.

"There seems little question but that the scholarships and fellowships program envisioned by this legislation is of the most far-reaching significance.

"In the organizational structure of our college where 95 per cent of the faculty and staff is full-time, a policy has been established which considers research as part of the responsibility of each faculty member. In actual practice, however, the lack of adequate funds to provide assistants for routine tasks seriously dilutes the effectiveness of the research program.

"In regard to Federal contracts with institutions to extend research programs, our thought is that Federal assistance would not discourage or stop up avenues of private support. The legislation under study should actually stimulate private sources of income because it will give a new impetus and a broader scope for research activity.

"A review of the testimony which was given when this legislation was pending before the seventy-ninth Congress indicates that inadequate stress was placed on the disparity, during the past 25 years, in the development of science and education on the one hand, and of the industrial and economic structure on the other. While the national income from 1929 to 1939 was practically doubled, the annual expenditures for capital outlay for all institutions actually dropped from approximately 109 to 84 million dollars. (Biennial Survey of Education, U. S. Office of Education). In addition, it is apparent that the almost traditional sources of income to such institutions are pegged, by a large number of reasons, at about the present level. Since we must extend our accomplishments in these fields it seems obvious that a program of major national support must be initiated.

"While there likely will be no dearth of applications for assistance under this program, a statement by the late Dr. Frederick Keppel is significant here. Dr. Keppel pointed out that there are instances where research workers are so situated that they have neither the time, the talent, nor the sponsors for fund raising and as a result their efforts are seriously handicapped. Consequently, it is to be hoped that the Foundation will make serious effort to encourage the obscure worker or institution where there is promise that effective work might be expedited.

"The President will have the responsibility of nominating the membership of the Foundation from among persons who are not only outstanding and representative in the scientific fields, but also blessed with a fair share of the quality of impartiality. Both H.R. 942 and H.R. 1815 recognize that the administration will require advisory committees for aid in the evaluation and selection of projects in the respective fields. The Administrator or the Executive Committee, as the case may be, cannot be over-zealous in ensuring adequate and impartial representation on these advisory committees."

PUBLIC ASSISTANCE ROLLS IN 1946

Nearly 200,000 more children were receiving Federal-State aid at the end of 1946 than were on the public assistance rolls at the end of 1945.

The number of children aided under the program for aid to dependent children, which is one of the three Federal-State public assistance programs of the Social Security Act, increased from 701,000 to 887,000, or 26.5 per cent, in 1946.

This was the greatest increase of any of the three programs. The number of old-age assistance cases increased from 2,056,000 to 2,196,000, or 6.8 per cent, and the cases under the program for aid to the blind increased from 56,000 to 60,000, or 7.6 per cent.

The amount of money expended for all three programs in 1946 reached a total of $1,054,188,000, an increase of about 17.6 per cent over 1945.

The major portion of the expenditure, $822,061,000, was for old-age assistance, although the costs of this program increased but 13.1 per cent. Aid to the blind reached a total of $23,306,000—an increase of 14.4 per cent. The largest percentage increase was in the program of aid to dependent children. This was an increase of 39.6 per cent, representing an expenditure for the calendar year 1946 of $208,821,000.

In its eleventh annual report recently submitted to Congress, the Social Security Board (now the Social Security Administration) listed, among other goals, a recommendation for Federal financial participation in the costs of medical services made available to needy persons under State public assistance programs and in assistance payments to needy sick persons who reside in public or private medical institutions other than mental hospitals and tuberculosis sanatoria.

PARRAN STRESSES IMPORTANCE OF CONTROLLING CANCER, HEART DISEASE AND DIABETES IN ANNUAL REPORT

The growing importance of heart disease, cancer, and other chronic conditions of later life in our aging population is stressed by Surgeon General Thomas Parran in the annual report of the U. S. Public Health Service, Federal Security Agency. This report, a 163 page summary of the activities of the Service in the fiscal year ending June 30, 1946, was transmitted to Congress February 13, 1947.

"As we have gained victories over the major communicable diseases," Dr. Parran points out, "conditions such as heart disease, cancer, and diabetes have moved to the fore as causes of death." The report describes intensified research in these fields by the National Institute of Health, research arm of the Public Health Service, as well as a new program of aid to the States in setting up cancer control programs throughout the Nation.

Dr. Parran also stressed the need for the extension of necessary health services to all citizens. "Shortages and uneven distribution of health personnel, hospital beds, and clinics, as well as economic barriers, still make it impossible for many Americans to get the basic health services needed to protect their own health and that of their neighbors," he said.

Passage of the Hospital Survey and Construction Act launched a 5-year program of aid to States in surveying their needs and in building an integrated system of hospitals and health centers. "For the first time," Dr. Parran points out, "a national policy has been established whereby hospitals and health centers are to be planned, located, and operated in relation to the over-all health needs of the people."

Passage of the National Mental Health Act marked the first large-scale, co-ordinated attack on a problem which affects some 8,000,000 Americans, and fills more than half of our hospital beds. The Act provides for a National Institute of Mental Health (a research center) and for Federal aid in research, in training of badly needed personnel, and in the development of State and local mental hygiene services and clinics.

Adoption of a constitution for the World Health Organization, to operate under the United Nations, was another notable development during the year. This constitution, already ratified by five nations, is dedicated to active promotion of world health.

Among the Public Health Service activities covered by the report are laboratory and field research on a wide variety of diseases and health hazards; assistance to States and communities in strengthening their health organizations; special

programs in cancer research and control, industrial hygiene and the control of tuberculosis, and venereal diseases; medical services to the Coast Guard and other Government agencies; operation of Marine Hospitals and medical relief stations for merchant seamen and other legal beneficiaries, and hospitals for drug addicts and mental patients; foreign and interstate quarantine; vessel, aircraft, and railroad sanitation, and control of biologic products.

ARMY MEDICAL LIBRARY MICROFILM SERVICE

During the war, the Army Medical Library through its photoduplication services supplied millions of pages of microfilmed medical articles to the armed services and other research agencies. The principle of immediate aid direct to the user, wherever he might be, introduced a new technic to assist medical research.

This service is now generally available for civilian physicians, institutions, and research workers on a cost basis. This means direct access to the Library's enormous resources of medical literature.

A fee of fifty cents is charged for filming any periodical article in a single volume, regardless of length. Microfilming from monographs is furnished at fifty cents for fifty pages or fraction thereof. Photostats are also available at a charge of fifty cents per ten pages or fraction thereof. Material filmed is not for reproduction without permission of the copyright owner.

For convenience and to keep bookkeeping costs down, a coupon system has been established. Users may buy any quantity of photoduplication coupons at fifty cents each. Order blanks are available upon request. Checks should be made payable to the Treasurer of the United States, and sent to the Army Medical Library, 7th St. and Independence Ave., S. W., Washington 25, D. C.

INFANT FEEDING—WAGNER

(Continued from page 438)

baby, the stools will be formed, brownish, alkaline, and nonirritating; the odor will be foul as from putrefaction. The number may vary from three to ten a day.

The difference between infectious diarrhea and a fat and carbohydrate indigestion is that before the onset of the former there is usually a history of the infant doing well on its formula; he is thriving, happy and contented. Suddenly, without a change in his feeding routine, he develops a fever and diarrhea. If the stool is cultured one will usually find some pathogenic organisms such as Staphylococcus, Streptococcus, Salmonella, etc.

In parenteral diarrhea again one has the story of the baby who was doing well on its feeding routine until it developed an upper respiratory infection and diarrhea started. Upon examination one usually finds signs of a cold, an otitis media, a pneumonia, cystitis, or other acute systemic infection.

The treatment of these types does not vary much except where one is dealing with a protein diarrhea with foul, brown, nonirritating, alkaline stools. In these cases about all that is necessary is to thin out the formula a little and add more carbohydrate. The rest of the diarrheas mentioned can be treated in the same way with some slight additional factors. For example, if one is dealing with an infection of the intestinal tract, then the additional use of penicillin or a sulfonamide may be desirable. When the diarrhea is not primarily due to an intestinal factor, in addition to treating the diarrhea one would concentrate upon the otitis media or pneumonia or cystitis, etc.—whatever is the primary factor.

Keeping the aforementioned variations in mind, the general routine for the care of diarrhea is suggested as follows: If the baby's formula has been heavier than half milk and half water, it should be reduced to half boiled skimmed milk and half boiled water. On the other hand, if it has not been more than half milk and water then it should be reduced to one-third boiled skimmed milk and two-thirds boiled water. This immediately eliminates the offending fats and carbohydrates. The total amount for each 24 hours should be equivalent to 3 ounces a pound of body weight. Thus a 7 pound baby should take at least 21 ounces in 24 hours—5 ounces boiled skimmed milk and 16 ounces of boiled water. This should be continued until the baby becomes constipated and that should take a day or 2. Once the diarrhea is under control the formula is increased 1 ounce of milk and ½ ounce of cream a day until the proper formula for the baby's age and weight is attained. The sugar is slowly added at the same time.

In addition, if the infant's appetite has been so impaired that it does not take the allotted 24-hour amount, then the difference should be made up by intravenous or subcutaneous administration of Hartmann's solution (Ringer's lactate solution). But if the baby is not satisfied with this weakened formula, as very frequently happens, the mother is instructed to give it 3 or 4 ounces of tea sweetened with glucose or saccharin three or four times daily plus all the fruit juice and water necessary to keep it comfortable. In this instance it will be unnecessary, of course, to use fluids parenterally. A strong black tea enema of 1 pint daily may also be helpful in controlling the diarrhea.

While these measures will probably take care of the great majority of diarrheas, there are certainly other conditions that should be thought of if the diarrhea does not respond in a few days to the regime outlined. Typhoid fever, tuberculosis, dysentery, celiac disease, histoplasmosis, and intussusception should be considered.

The subject of diarrhea could hardly be discussed without a word on infectious diarrhea of the newborn. This disease entity—if it is a disease entity—is still an etiologic and therapeutic problem. About all that is known of the disease is that it is apparently contagious and passes from one baby to the next in a nursery. Cultures of excretions from the nose, throat, and stool do not reveal any constant or specific organism. The usual picture is that of a baby 3 days to 2 weeks old suddenly refusing to eat for a day or 2 and then having loose watery stools that are explosive in character and devoid of solid matter. He may have from 8 to 20 or 30 such stools each 24 hours. There is rapid loss of weight and the appetite is markedly impaired. Usually there is no fever. There is nothing constant or pronounced in the blood picture. Either the baby responds to the therapy or the progress is rapidly downward to death. So far as therapy is concerned it is more or less supportive. In addition to the dietary routine outlined previously for diarrhea, Hartmann's solution and glucose and saline intravenously are used to try to make up for loss of weight, fluids, and electrolytes. Daily transfusions, as well as an abundance of vitamin C and B complex orally or by hypodermic, are given.

135 So. 17th Street

Book Notices

PROGRESS IN NEUROLOGY AND PSYCHIATRY. Edited by E. A. Spiegel, M.D., Professor and Head of the Department of Experimental Neurology, Temple University School of Medicine, Cloth. Pp. 708. Price $8.00. Grune & Stratton, Inc., 443 Fourth Avenue, New York, 1946.

There are thirty-nine sections in this volume of 700 pages, dealing with a range of subjects from neuroanatomy to psychoanalysis, from neuroembryology to psychosurgery, by authorities who rank in their fields. As the editor mentions in his preface, the subject matter covers the war year from December 1944, to December 1945, and is intended to serve as a review of the field and to be in a way a form of postgraduate instruction for physicians in civilian practice as well as those returning from the service. Fifty-three contributors helped make up the volume. Forty-three of these are M.D.'s, six are Ph.D.'s, two have M.Sc. degrees, one an M.A. and one no degree.

Each article is a study in itself, and is precisely recorded. Each has a generous bibliography; the one by Gerard and Libet on "General Neurophysiology" for example, contains 345 references. This is followed by a study on "Electroencephalography" by H. H. Jasper and John Kershman with 169 titles; a study by Henry Wycis on "Cerebral Trauma" with 130 titles; and one on "Shock Therapy" by Bennett and Engle with 127 references. Others follow with somewhat shorter bibliographies.

Continuing the appraisal of the book in terms of statistics, it is of interest that of the 700 pages, approximately 150 pages are devoted to psychiatry and of that, fifty pages are taken up with shock therapy and psychosurgery. This leaves only about 100 pages of this volume to the substance of psychiatry itself. This ratio of allotment of space to the organic and dynamic is indicative of the attitude of medicine in general toward psychiatry. It is easy and conventional to think in terms of the tangible, but difficult to make practical the psychic stuff.

The volume is actually an excellent short course in the ground work of neurology, for it is a presentation of the current status of that field from the basic sciences to the clinical. It is superior to a text book for this for it is based upon the latest literature. The neurologist and surgeon doing neurological surgery will find the work of inestimable value. It is time saving in keeping abreast of progress in the field especially since the material presented is in a discussion form

For the general practitioner, much of the material will be technically superfluous, unless he has a special interest in this subject.

THOMAS J. MEYERS, D.O., F.A.C.N.

MONGOLISM AND CRETINISM. By Clemens E. Benda, M.D.; Director, Wallace Research Laboratory for the Study of Mental Deficiency, Wrentham, Mass., Instructor in Neuropathology, Harvard Medical School, Assistant in Psychiatry, Massachusetts General Hospital, Lecturer, Postgraduate Seminar, Massachusetts Department of Mental Health. Cloth. Pp. 310, with illustrations. Price $6.50. Grune & Stratton, Inc., 443 Fourth Avenue, New York, 1946.

Conditions such as mongolism and cretinism are not as a rule of particular interest to general practitioners. In fact, to the average physician they represent a subject that is essentially dry and morbidly hopeless. It is refreshing then to read a new and clearer presentation of these conditions with a note of optimism as to their future elimination.

The author describes the physical characteristics of the mongoloid and cretin in great detail in the second chapter of the book. He states of the mongoloid, "The body of the mongoloid appears fairly proportionate in childhood, but the mongoloids are children who are 3 to 5 years behind their chronological age, and the hands and feet are short out of all proportion. . . . (they) are a castrated 'race' deprived of the adrenal-gonadal activity which dominates the three decades from the middle of the teens to the end of the forties. After a prolonged babyhood and infancy, these unfinished children become old people and manifest all symptoms of old age."

He then covers the mental development as thoroughly in the succeeding chapter. Of the mongoloid, he says, "The highest mental age of children below 10 is usually around 5 years. This means that under most favorable conditions the monogoloid child would not be able to enter public school or kindergarten before an age of 10 years, but by that time the child would be too old and not acceptable. On the other hand, further mental development can be expected in the period from 10 to 20 years. . . . the mongoloid has dormant possibilities of improvement." Of the cretin, he summarizes, ". . . there is no uniform psychology of the cretin, but there is a very uniform change in mental behaviour under thyroid deficiency."

Chapter Four is devoted to the neuropathological findings, with many references to authorities. This may be tied up with Chapter Six which covers the general pathology of these conditions. The section dealing with the state of the endocrine glands is most thorough and is illustrated by numerous case reports.

Then follows detailed discussion of the growth and development of the skull and bones, with x-ray studies, the hematology and biochemistry of these conditions and the relationship of mongolism to the maternal condition. This latter chapter is the most practical of the whole book. The author considers the problem first from the standpoint of heredity, but is inclined to disagree with this explanation. Another theory holds that the damage to the germ plasm is causative. This, however, is termed speculation based upon the study of twins. Next is considered the pathologic condition of the mother in the beginning of pregnancy. An analysis of 2,822 cases indicates that the age of the mother plays a role, the average age of the mother of a mongoloid child is more than 10 years higher than the average maternal age. More than 50 per cent of mothers were beyond the age of 35 when their mongoloid child was born. Further studies on the condition of these mothers showed common factors to be a state of nervousness, being easily upset and high strung, a history of frequent abortions, bleedings during pregnancy, premature births, difficulty in impregnation, and endocrine imbalance. The author has illustrated these points by numerous case histories. He feels that the basis for "ill-finished" children is a fault in the inner secretory response to a pregnancy. He closes the book with a chapter on the prevention of mongolism and one on treatment.

There is much to be said in favor of this book—and some against it. To be sure it is an optimistic approach to the problem and gives a practical touch to what is considered an almost hopeless problem. More than anything else however, the book tells of something to do about it. It can be criticized on the ground that conclusions are drawn on rather uncertain bases. The author relies perhaps too much upon statistics. On the whole, however, the book can be recommended quite highly for general practitioners, not only for its information about mongoloids and cretins, but also for its advice relative to pregnancies in the later childbearing years.

THOMAS J. MEYERS, D.O., F.A.C.N.

FOOD AND HEALTH. By Henry C. Sherman, Mitchill Professor of Chemistry, Columbia University. New edition completely revised and reset. Cloth. Pp. 290, with illustrations. Price $4.00. The Macmillan Company, 60 Fifth Ave., New York, 1947.

Here is a book of interest and value to the layman as well as to the professional. In simple nontechnical language, the principles of nutrition have been set down by an acknowledged authority on the subject. So simply is it written that the average housewife can follow and make use of it; yet, so complete is it in the presentation of the subject of nutrition, that the professional, too, will find it an aid.

Although written for the layman, the book does not neglect the important points of physiology and chemistry as they apply to nutrition. Chapters such as those on digestion and assimilation of food, proteins, and amino acids, and the various vitamins include the latest scientific information on those subjects.

For the physician who would like to get a simple yet complete picture of modern nutrition or who would like to have a guide for explaining the matter to his patients, this book will prove very serviceable.

Collected Papers of the American Osteopathic College of Radiology*

Some Thoughts on the Relation of Physiology of Bone to the Interpretation of Roentgenograms

Trenery Lecture—1946

EUGENE R. KRAUS, D.O., F.A.O.C.R.
New York

It is a privilege for any member of the osteopathic profession, particularly a radiologist, to honor and perpetuate the name of Floyd B. Trenery by delivering this lecture.

Floyd Trenery was a pioneer radiologist in the osteopathic profession. I knew him personally for about 10 years. Previous to that, for as much as 15 years, I had corresponded with him and read many of his published articles. We had long discussions relative to the founding of the American Osteopathic College of Radiology. He was most active in its beginnings and, as most of the profession knows, he was the first president of the American Osteopathic Board of Radiology.

His was a most stimulating personality with a fine sense of relative values and justice and a great desire to build and organize. His high ideals relating to the practice of radiology were such that those of us who associated with him in the transactions of the Board and the founding of the College have been inspired to carry on the trail he blazed.

EUGENE R. KRAUS

In their classic on x-ray diagnosis, written 25 years ago, Baetjer and Waters[1] said: "The correctness of diagnosis depends entirely upon the skill with which various shadows are separated and interpreted. To interpret these shadows correctly one must know not only the appearance of normal structure, but also the alterations that take place when there is a pathological process present. It therefore follows that the ability of the roentgenologist depends not so much upon his technical skill as upon his familiarity with the general problems of medicine and surgery."

Since those lines were written, much progress has been made in the field of physiology, and our increased knowledge has led to a more satisfactory understanding of what is seen on the x-ray film. It is the purpose of this paper to emphasize the fact that physiology is not a dry and academic subject, but one that must be depended on for a better understanding of problems of clinical radiology.

The view that bone is a specialized connective tissue concerned only with support and locomotion and having only a passive role in transmitting and resisting mechanical stress is grossly erroneous. Viewed from the standpoint of physiology, the femur has less morphological stability than a layer of fat. The radiologist is more familiar with the gross anatomy of bone than is the pathologist, yet both ignore bone as a functioning physiological organ in which continuous change occurs.

The history of the parathyroid glands is a dramatic example in the application of physiology to the study of a hitherto puzzling and complex disease.[2] These glands were first discovered in 1858 and repeatedly rediscovered. In 1891 von Recklinghausen described a heterogeneous group of diseases which he called osteitis fibrosa cystica from the histological findings. He considered this an intrinsic disease of bone. In 1907 Erdheim drew attention to the relation between the parathyroid and the skeleton and his conclusion was the partial truth—that hypertrophy and hyperplasia of this gland are a result and not a cause of general decalcification. This conclusion retarded the final understanding of the exact nature of von Recklinghausen's disease. In 1925 Mandl defied tradition, removed a neoplastic parathyroid and observed a clinical cure in his patient. So it may be noted that a period of 67 years passed after their discovery before a real understanding of the physiology of the parathyroid glands was established.

Structurally, bone consists of a fibrous, periosteal investment, fine-fibered compact cortical bone, coarse-fibered spongy and trabeculated bone, endosteum, red marrow, and reticuloendothelial elements in the ends of the shafts and in the flat bones, and yellow fatty marrow in the medullary cavities of the shafts. The blood supply comes mainly from the nutrient artery, though some comes through an anastomosis which exists between it and the vessels of the periosteum which course through the Volkmann and haversian canals.

There are three important factors to be considered in the physiology of bone—the development of bone which includes its growth, the absorption and replacement of bone, and the effect of outside influences on bone.

DEVELOPMENT OF BONE[3]

Bone formed in membrane gives rise to the cranial vault and mandible and is preceded by a connective tissue matrix and a center of ossification from which spicules of bone are laid down as the osteoblasts advance. Large vascular channels appear in the bed of the developing red marrow, forming the future diploe and vessels. No parallel columns of cartilage cells are present in this type of bone development; hence, the bones of the vault never present cartilaginous exostoses.

The intercartilaginous ossification is more complex. The cartilage of the fetal skeleton is developed by the second month. It consists of a shaft with an epiphysis at each end. Bone formation starts at the center of the shaft and at the perichondrium peripherally. The fibroblasts of the periphery become osteoblasts and lay down bone at the middle of the shaft. The cartilaginous matrix of the shaft becomes calcified. This cartilage is removed by osteoclasts. Hence the

*Papers presented at the annual meeting in Kansas City, Mo., September 29, 30, 1946. Other papers given at this meeting will be published in future issues of THE JOURNAL.

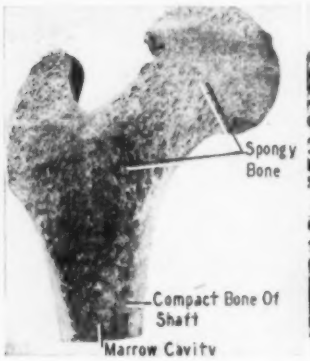

Fig. 1

Fig. 2

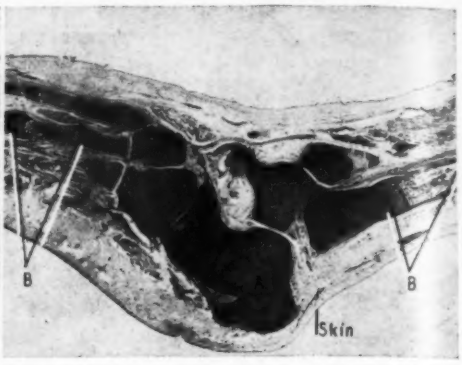

Fig. 3

Figs. 1. Head of femur, longitudinal section. 2. Transverse section through compact bone, ground preparation. Haversian lamellae, interstitial lamellae, lacunae, and canaliculi. 3. Section through foot of human fetus. The future bones (A) are laid down as cartilage; ossification (B) is taking place.

process begins with a cartilaginous mold which is finally replaced by bone.

At birth, the diaphyses of the long bones are ossified. The ends of the long bones ossify later from separate centers which appears at different times in various bones. The epiphysis remains separated from the shaft by the epiphyseal cartilage until the bone is fully matured.

The growth of the developing bone is maintained by the action of the periosteum and the epiphyseal cartilage, the growth width by the former, and that in length by the latter. The epiphyseal cartilage continues to grow, preceding the new bone which is laid down at the end of the shaft. Finally the epiphysis and the diaphysis unite and bone development is complete. At maturity all the bones are fused. This fusion is complete in women a year or 2 earlier than in men. The growth of the skeleton is influenced by the action of hormones, vitamins, environmental conditions, and heredity.

Bone is the calcium and phosphorus reservoir of the body, and its composition depends not only upon the amount of inorganic material supplied by the diet and the individual's ability to absorb such inorganic material, but also upon the demands of the organism generally for these inorganic salts. Blood contains about 10 mg. of calcium per 100 cc. If the concentration of soluble calcium salts in the blood decreases, calcium is taken from the bones to maintain the concentration in the blood. Calcium is absorbed from food in the small intestine and excreted by the large intestine. The difference between the calcium intake and excretion is known as calcium balance. The absorption of calcium in the body is controlled largely by the amount of calcium ingested, by the presence of vitamin D, and by the acidity of the bowel. Deposition of calcium salts in bones and cartilage depends mainly upon protein constituents of cartilage, upon carbon dioxide content of the plasma, and upon the action of phosphatase. Phosphatase is an enzyme which hydrolyzes phosphoric esters into inorganic phosphate. It is usually alkaline except when found in the prostate, where it is acid.

Calcium and phosphorus are in equilibrium in the serum, the normal ratio being about 10 to 3. If this ratio is changed, there will be a loss of minerals from the bones resulting in a disturbance of structure as noted in renal rickets, hyperparathyroidism, etc.

The normal pattern of bone seen on a radiosensitive film is familiar to us all. The cortex is formed by heavily impregnated bone which is heaviest about the middle of the shaft and becomes attenuated as it approaches the end. The articular surface is covered by a thin layer of cortex. The central portion of long bones appears as a smooth area of lessened density, the medullary cavity. The periosteum ordinarily does not cast a shadow; its visualization denotes disease.

The ends of the bone are covered by hyaline cartilage. The cartilages of opposing bones form the joint space observed on the radiogram, since cartilage is not visualized because it contains no calcium. If, therefore, calcification is visualized in a joint space, disease is present.

The full growth of bones does not mean that an unchangeable stage of the skeleton is reached. The adult bone, as the growing bone, is subjected to changes of the entire body. The normal bone, like the skin, undergoes continuous absorption and repair.

THE ABSORPTION AND REPLACEMENT OF BONE

No other alteration in the structure and composition of bone is so dramatic as that produced by the blood supply. In Sudeck's atrophy, trauma produces such marked vasodilatation and increased blood flow to an extremity that within 48 hours deossification is demonstrable by x-ray. That is the hallmark of hyperemia anywhere in bone whether due to trauma, infection, neoplasm, or reflex vasomotor changes, though the usual deossification is not marked until after about 1 week. Nevertheless, the normal structure disappears suddenly, with a reversion to fibrous connective tissue. No osteoclasts are involved; the mechanism is totally humoral. Moreover, the decalcifications are particularly pronounced in regions that coincide with vascular beds and channels. This type of deossification is noticeably different from the diffuse, disseminated type due to passive causes such as disuse or nutritional and endocrine deficiencies. Leriche and Policard[4] summarize thus: Hyperemia is followed by decalcification and osteoporosis; lessened circulation by osteosclerosis, and loss of blood supply by necrosis.

The prime example of new bone formation is the repair of fractures. As a result of fracture, a hemorrhagic exudate forms between the fragments.

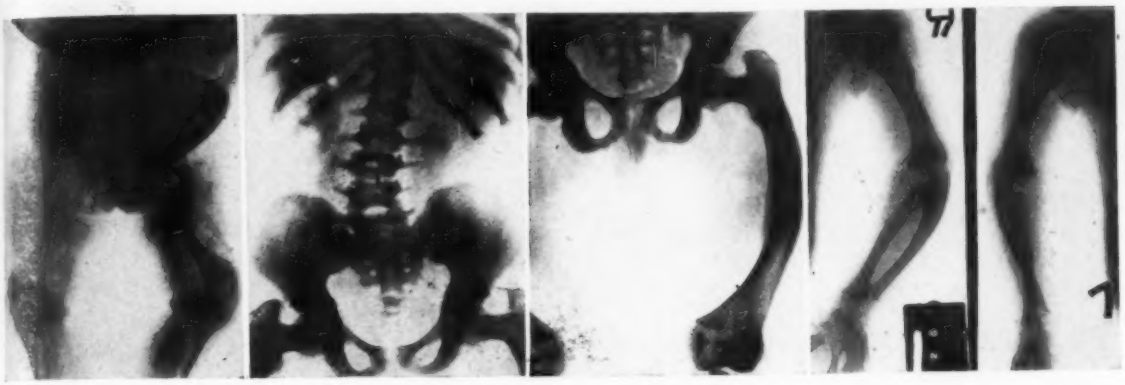

Fig. 4 Fig. 5 Fig. 6 Fig. 7

Figs. 4. Osteogenesis imperfecta showing a pathognomonic x-ray film with a tapering of the bone from the articulation toward the center and poor contrast due to lack of adequate bone formation. 5. Marble bones showing the characteristic density due to excess of inorganic material. 6. Marble bones showing deformity due to faulty development of the bone, lack of lamellae, and increased density due to excess of inorganic material. 7. Achondroplasia visualizing the failure of the bone to grow in length due to faulty development of the epiphyseal portion of the bone and deformity of the epiphysis.

This exudate is invaded by cells and new capillaries, producing a kind of granulation tissue. Should the exudate remain fluid without granulating, no fibroblasts will invade that medium, and the first stage of repair will not occur. With hyperemia, there is always decalcification; hence, there is absorption of the ends of the fragments; if hyperemia is prolonged, decalcification is excessive, interfering with union.

Osteoid tissue resembling bone in its structural characteristics forms rapidly and, at the end of 1 week, bony spicules appear, but union is never complete until after 1 month at the earliest. Calcium is deposited in the osteoid tissue as the result of complex physicochemical conditions and is entirely a local phenomenon. If soft tissue is interposed between the fracture ends, or if distraction is produced, fibrous tissue forms and nonunion results. If immobilization is poor or if repeated motion occurs between the fragments, the formation of cartilage is promoted, delaying union. As the result of stress and strain, the new bone, or callus, undergoes a process of molding that continues for months, the osteoclasts removing excess bone and realigning the medullary canal.

The understanding of the absorption, replacement, and production of new bone is a factor of highest importance to the radiologist since, in interpreting a roentgenogram, our greatest information is gained from the presence of diminished or increased density in different diseases and different locations.

In order to emphasize disturbance of bone development and function the following classification has been found convenient: (1) Developmental defects; (2) vitamin disturbance; (3) endocrine disturbance; (4) infections.

DEVELOPMENTAL DEFECTS

Osteogenesis Imperfecta.—This is a rare disease but one which, with several now to be named, demonstrates the failure of bone development. As the name implies, satisfactory cartilage replacement by bone does not take place. Consequently, the x-ray films show a thinned cortex, a dilated medullary cavity, and the long bones tapering from the articular ends toward the middle. Bone trabeculæ are not visible. Deformity of the bones and fractures are frequently observed; union and healing occur readily as in normal bone.

Marble Bones or Albers-Schönberg Disease.—This disease is characterized by calcification of osteoid tissue and absence of true ossification as shown by lack of lamellæ and osteoblasts. Consequently, a radiogram will show a rather dense homogeneous shadow with an absence of medulla and often an obliteration of the epiphyseal line. Due to the brittleness of the bones, they are often fractured. The vertebræ are strikingly increased in density.

Achondroplasia. — This condition has been observed clinically by most of us. The individual has short arms and legs, a large trunk and head and a depressed bridge of the nose. It is a classical example of disturbance of bone growing in cartilage, particularly the epiphyseal ends of the bones, while the bone developed in membrane grows within normal limits. Boyd[5] points out that dachshunds are achondroplastic dogs selectively bred. The x-ray findings depend upon the stage at which the study is made. The long bones are shorter than usual, the epiphyses are irregular (de Lorimier[6] exhibits one case which was mistaken for rickets). The union with the epiphysis may be retarded or may never occur. There is usually deformity of the head and of the neck of the long bones resulting from the stresses of weight-bearing. Skull deformity is present.

Hereditary Deforming Chondrodysplasia.—This is a disturbance of developing epiphyseal cartilage. The condition is found in flat bones as well as in long ones. The main factors are deformities from retardation of growth due to the presence of multiple cartilaginous tumors. Such tumors may affect only part of a bone or may affect multiple bones. The roentgenographic findings may be of a typical lace-like pattern observed in an osteochondroma together with that of deformity and often dislocation of one or several bones, usually of the extremities.

Fibrous Dysplasia of Bone.—This is an interesting and controversial entity described by Lichtenstein[7] and Jaffe[8] with variation by Albright and associates.[9] Lichtenstein described the disease as an anomalous function of the bone-forming mesenchyme. Normally this tissue forms spongy bone and marrow. In this dysplasia the bone-forming mesenchyme gives rise to proliferating fibrous tissue in which scanty bone particles are still found. The fibrous dysplasia may be single or multiple. Usually such areas are confined to one extremity or one limb. The skull may be involved. There are no abnormal variations in the percentage of the calcium or phosphorus in the blood.

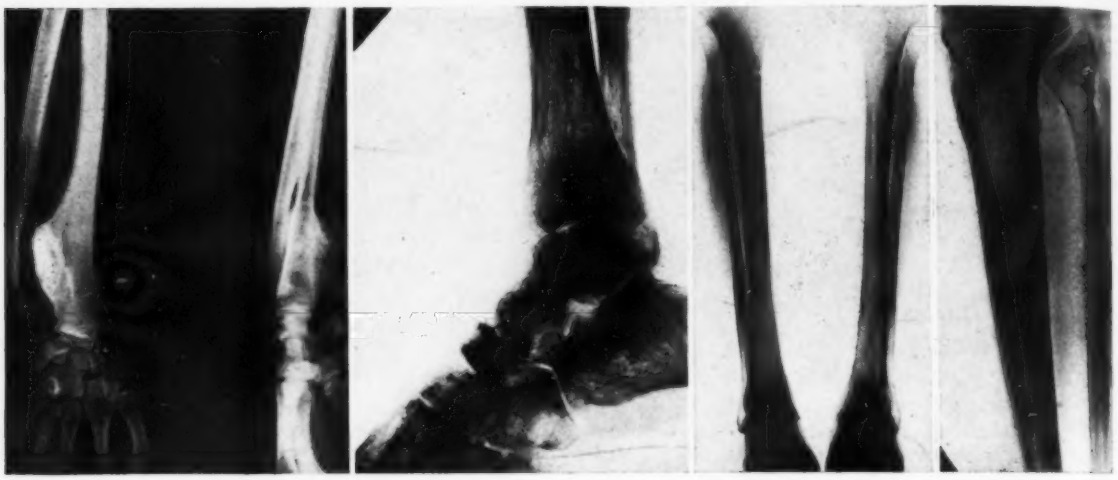

Fig. 8 Fig. 9 Fig. 10 Fig. 11

Figs. 8. Hereditary chondrodysplasia resulting from cartilaginous neoplasms distorting the joint. 9. Reflex hyperemia of bone resulting in a generalized decalcification of the bones of the feet and ankles. Note the regular pattern of absorption which follows the course of anastomosis of the arteries in this area. This may follow trauma, infection, neoplasm, and nerve instability. 10. Passive hyperemia, to be distinguished from reflex hyperemia. The right side has a normal calcification; the left shows calcium absorption due to disuse. There are no regular defects in bone such as observed in reflex hyperemia. 11. Fracture showing the formation of new bone, and periosteal reaction on the bone adjacent to the fracture.

The condition may be found accidentally. Albright's syndrome is associated with endocrine disturbance and pigmentation of the skin. The sex glands and the thyroid are the endocrines involved. Fibrous dysplasia is, of course, present. Radiographically there is a broadening and expansion of the shaft and a thinning of the cortex, giving a rarefied and trabeculated appearance suggesting cyst formation. Deformity of the bone may be present and fracture may occur.

Histologically, no cyst is present, the appearance of one being due to substitution of gritty, grayish, fibrous material for spongy bone. The presence of fibrous dysplasia may be suspected but biopsy is necessary for final diagnosis.

Tumors of Bone.—Geschicter and Copeland[10] emphasize that in the consideration of bone tumors not only adult bone should be studied, but also the development of bone. The skeletal development is really never complete, for the transition forms between different tissues persist in certain places at all ages and may serve as a starting point for tumors.

I. *Benign Tumors.*—Due to space limitations, some benign tumors will have to be omitted.

Osteomata: These may be either compact or cancellous. The compact type is composed of cortical bone and is seen most frequently in the frontal and maxillary sinuses; the cancellous osteoma is similar to bone in composition. It has its own epiphyseal cartilage and grows as long as the skeleton continues to grow. It arises from the end of the long bone, probably from a segmented epiphyseal cartilage. As the bone grows in length, the tumor becomes displaced from the region of the epiphyseal line.

Chondromata: These are composed of cartilage and may arise either from the epiphyseal cartilage or from unabsorbed fetal cartilage. The x-ray shows localized defects in the bone, usually an expanded cortex and frequently a typical lace-like pattern. Often they are found in the shafts or extending from the cortex of the small bones of the hands; then they are called multiple enchondromata.

Hemangiomata: These tumors are characteristic when viewed on x-ray negatives. They have been observed most frequently in the vertebral body where they form striations accompanied by considerable calcium absorption.

Giant Cell Tumors or Osteoblastomata: These are benign tumors which are locally destructive and do not metastasize, though there are exceptions to this rule since these and other innocent growths may undergo malignant change. They usually develop before the thirtieth year and are found principally at the ends of long bones, being placed eccentrically, especially in the knee, but can be found in any bone which develops in cartilage. They are never found in membranous bones. The roentgenogram is frequently pathognomonic. It shows a rarefied multicystic or trabeculated appearance as if the mass were composed of a large soap bubble. The cortex is thin and the lesion is sharply limited from the surrounding soft parts.

Osteoid Osteomata: These tumors are mentioned because they are a comparatively new discovery and like most new findings are subject to considerable controversy. The chief symptoms are pain which interferes with sleep, joint stiffness, limping, and weakness. Signs of inflammation are absent. The lesion is described by its discoverers, Jaffe and Lichtenstein[11], as a small, benign, slowly growing, osteogenic tumor. In the early stages, it is composed largely of osteoid tissue. Subsequently, this tissue becomes calcified and converted into hypercalcified atypical bone. The outstanding characteristic of this tumor is the excessive perifocal response it produces in surrounding bone.

Jaffe and Lichtenstein say that the radiographic findings are the most valuable single guide to diagnosis. In the early stage, the tumor appears as a roundish, radiolucent, rarefied area from .5 to 2 cm. in diameter. Later in its evolution, as it tends to become calcified, it may present an opacity, but this is still observed on the film since there is a radiolucent area surrounding the tumor which distinguishes it from the re-

Fig. 12 Fig. 13 Fig. 14

Figs. 12. Fibrous dysplasia of bone. The femur on the right side shows the enlargement of the medulla and the thinning of the cortex and cyst-like areas of bone as compared with the normal left femur. 13. Giant cell tumor. Note the eccentric position of the tumor and its soap-bubble type of appearance. 14. Osteoid osteoma. Note the circumscribed area of diminished density on the external portion of the cortex and the densely reactive bone surrounding the nidus.

actively opaque bone. Sometimes in the shaft of a long bone it is impossible to visualize the original tumor due to the density of the adjacent bone.

II. *Malignant Tumors.*—Malignant tumors of bone are either primary or metastatic.

Metastatic Tumors: These are most frequent and are therefore mentioned first. They are most likely to spread from the breast, prostate, kidney, thyroid, etc. They are carcinomatous in character, and most of them show a classic picture on the x-ray of irregular areas of bone absorption. An occasional cancer, in addition to being destructive, is osteoblastic. This is particularly true in prostatic tumors. Sometimes there is a combination of both osteolytic and osteoblastic tumor formation going on simultaneously in the bones. Bone metastasis occurs by way of the blood stream, usually the medullary artery, and not by way of the lymphatics as was formerly taught.

Primary Tumors: There are three principal primary malignant tumors of bone. The osteogenic sarcoma is most frequent, Ewing's tumor next, and the multiple myeloma is comparatively rare.

(A) Osteogenic Sarcoma: This type of tumor is usually found in individuals from 10 to 30 years old. It is osteoblastic in character and generally starts in the shaft of the bone near the extremity. It gradually spreads outward and raises the periosteum. The formation of new bone follows the course of blood vessels in Volkmann's canals and gives the characteristic sun-ray effect. Eventually, the periosteum is destroyed and the tumor mass spreads to the soft tissue. The roentgen ray findings visualize a destructive process at the diaphyseal end of a long bone. If developed enough, the radiating spicules of new bone, perpendicular to the shaft, are visualized. Eventually destruction of bone may be so severe that fracture ensues. The response to radiation is poor. Metastasis to other bones is rare but to the lungs is not infrequent.

(B) Ewing's Tumor: This growth forms 10 to 15 per cent of malignant bone tumors. It must be

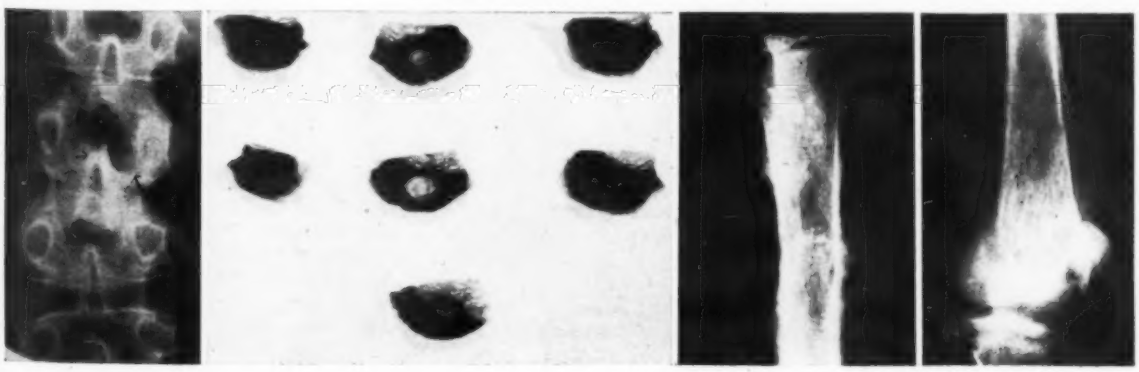

Fig. 15 Fig. 16 Fig. 17 Fig. 18

Figs. 15. Osteoid osteoma affecting the lamina of the third lumbar body where a distinct defect may be seen if compared with the laminae above and below. This case exhibited symptoms which were thought to be due to a herniated intervertebral disk. 16. Pathological specimen showing a central osteoid osteoma with the indurated bone tissue surrounding it. 17. Characteristic leg-of-mutton type of osteogenic sarcoma showing the sun-ray effect. 18. Ewing's tumor showing the laying down of periosteum parallel to the shaft giving a so-called "onion-peel" effect.

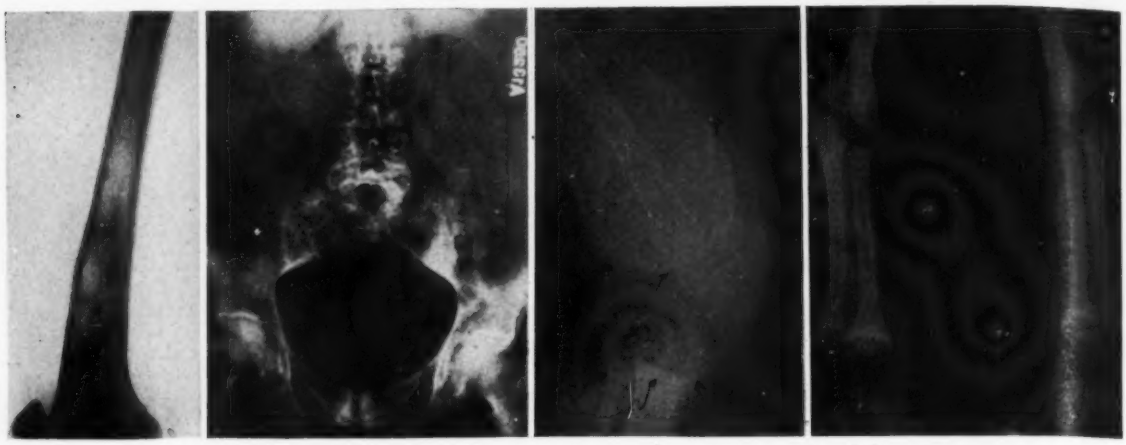

Fig. 19 Fig. 20 Fig. 21 Fig. 22

Figs. 19. Osteomyelitis showing a central defect and an "onion-peel" periosteal pattern. This is a proved case of osteomyelitis. 20. Plasma cell myeloma. This must be distinguished from a generalized carcinomatosis. 21. Typical case of scurvy showing changes in the diaphysis, subperiosteal hemorrhages with the formation of calcified hematoma and the presence of Wimberger's sign. 22. Rickets showing cup-like deformity in the diaphyseal ends of the lower portion of the ulna and radius; also showing a periostitis of all the bones of the arm and forearm.

differentiated particularly from osteomyelitis. The condition usually occurs in children between the ages of 5 and 15. Often there is a history of trauma followed by intermittent pain, swelling, and fever. Sometimes leukocytosis is present. Ewing considers this tumor endothelial in origin. The radiographic picture shows an increased density in the medullary portion of the bone which gradually spreads, causing bone destruction. Eventually the tumor causes the laying down of new bone beneath the periosteum, parallel to the shaft, giving the typical "onion-layer" appearance. Whereas this is quite indicative of Ewing's tumor, I have seen a parallel laying down of bone in osteomyelitis. Ewing's tumor is highly responsive to x-ray therapy and also tends to metastasize.

(C) Multiple Myeloma: This is a tumor composed of bone marrow cells. It is purely destructive in character, starts in the flat bones containing red bone marrow and later may spread to the long bones. The radiogram shows characteristic punched-out areas. They must be differentiated particularly from metastatic carcinoma. Response to roentgen therapy is good but only of temporary value.

DISEASES DUE TO VITAMIN DEFICIENCY

The two important deficiency diseases from a radiologist's point of view are scurvy and rickets. When vitamin C is deficient, there is a loss of intercellular substance which leads to an increased permeability of the capillaries and a failure of the epiphyseal cartilage to calcify properly. This results in hemorrhage in various parts of the bone and in the improper calcification of the growing bones. The x-ray findings, therefore, show irregular calcification of the diaphyseal and epiphyseal regions and possibly subperiosteal hemorrhages as evidenced by elevation of the periosteum. Sometimes there is a calcification in unabsorbed hemorrhagic areas, but a virtually pathognomonic sign is a dense calcific ring with a decalcified ground-glass center in the secondary centers of ossification, most pronounced in the femoral and tibial extremities (Wimberger's sign).

Rickets, as is well known, is due to deficiency of vitamin D. The essential lesion is failure of osteoid tissue to become calcified. The x-ray shows failure of calcification of the bone, "cupping" of the extremities of the long bones, perhaps deformity due to weight bearing with cortical thickening on the concave side and delay in the appearance of the ossification centers. The cortex of the bones, particularly of the skull, is often thinned. The findings depend upon the stage of the disease.

DISEASE OF THE ENDOCRINE SYSTEM

Practically all of the endocrine glands affect the growth and calcification of bone. The development of the sex glands controls the closure of the epiphyses. These glands, however, are controlled largely by the pituitary and thyroid, so that these latter, in turn, control growth, both directly and indirectly. It is a well-known fact that a deficiency in thyroid or a complete absence of thyroid secretion (cretinism) results in a delay of the appearance of growth centers and a retardation of epiphyseal closing. Excessive thyroid has frequently been associated with osteoporosis. Hyperpituitarism results in gigantism and acromegaly. But the greatest understanding of bone physiology has resulted from the study of the parathyroid glands.

When there is an adenoma of the parathyroid glands, this stimulates such glands to overproduce the parathyroid hormone, and a state of hyperparathyroidism is said to exist. The presence of this excess causes a reaction in the bones, resulting in generalized decalcification which shows on the x-ray as a thinning of the bone cortex, the formation of cysts, complete loss of bone structure, skeletal deformities, and perhaps fracture. The decalcification is general throughout the skeleton. This is important since it helps distinguish this entity from Paget's disease, fibrous dysplasia, giant cell tumors, xanthomata and kindred conditions. The blood calcium is elevated and the phosphorus is diminished, the calcium and phosphorus ratio thus being disturbed. The calcium balance is negative; phosphatase is increased. When the neoplasm

Fig. 23

Fig. 24

Fig. 25

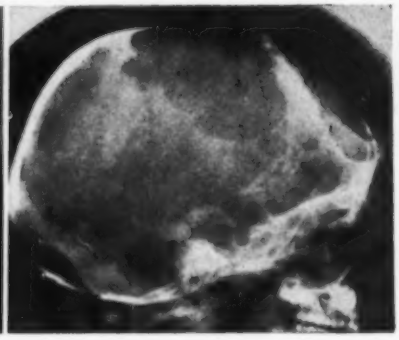

Fig. 26

Figs. 23. Hands of a 7 year old cretin. Normally there are seven growth centers present. 24. Hyperparathyroidism showing the formation of cysts and absorption of bone. 25. Hyperparathyroidism showing marked absorption of bone. 26. Schüller-Christian syndrome showing the replacement of a considerableportion of the skull by lipoid tissue causing a filling defect on the x-ray shadow.

is properly removed, the blood findings return to normal and the bones begin to recalcify.

Since endocrine diseases are really disturbances of the metabolism, mention may be made here of xanthomatoses. These are of interest to the radiologist since faulty metabolism of fats results in a deposit of lipoid material in bone, resulting in a displacement of calcium and consequent absorption.

Schüller-Christian Syndrome.—This is a disturbance of lipoid metabolism in young people, with nodular, yellowish, brownish deposits of cholesterol or its esters in the fibrous tissue and especially in the periosteum and dura mater. The deposits take the form of xanthomata. This disease involves especially the membranous bone of the skull where the x-ray notes distinct defects. Exophthalmos also may be present due to deposits of fat in the orbits.

Gaucher's Disease.—This disease affects particularly the reticuloendothelial system, is often familial, and generally presents an extreme degree of splenomegaly. The characteristic of the disease is the Gaucher cell which is a combination of cholesterol and protein, i.e., a cerebroside. These cells are present in various organs, including the bone marrow, and proliferate to excess. The x-ray findings show an irregular mottling of the long bones most frequently at the knee joint. There is a fusiform expansion with a thinning of the bone cortex.

INFECTIOUS DISEASES

Acute pyogenous osteomyelitis may localize anywhere, though in children it begins commonly at the metaphysis of a long bone. Infected emboli lodge in the end arteries of this highly vascularized zone producing local cancellous necrosis. The first signs, which must be carefully looked for, will be periosteal elevation, soft tissue swelling, and disturbance in the fascial planes in the region of the metaphysis. Later, rarefaction, necrosis, and periosteal reaction develop, though the subsequent course and old classical signs of sequestration, sclerosis, cloaca, and involucrum formation are rarely seen since the modern development of chemotherapy. The soft tissues are too often neglected by the radiologist; it is from a close inspection and comparison with the normal side that his keenest diagnoses are made.

The adult form of osteomyelitis usually follows trauma such as compound fracture. Because of the

Fig. 27

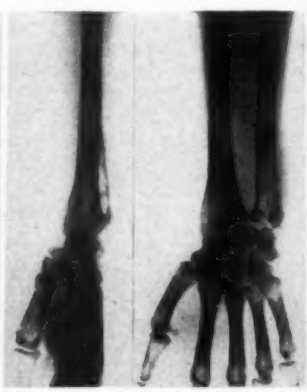

Fig. 28

Fig. 29

Fig. 30

Figs. 27. Gaucher's disease showing the characteristic bottle-like effect of the lower end of the tibia, typical of this disease. 28. Localized destruction in the shaft of the ulna, typical of tuberculosis. 29. Congenital syphilis showing the separation of the epiphyses, irregularity of the diaphyses of the femurs, a double line at the diaphyseal end of the tibia and fibula and a beak-like appearance on the inner margin of the diaphysis of both the lower end of the femur and the upper end of the tibia, frequently found in congenital syphilis. 30. Adult syphilis of bone with an irregularity on the anterior margin of the shaft of the tibia due to an ulceration of a gumma.

developments of chemotherapy, it, also, is rarely seen, even after shattered and contaminated war wounds. However, rarefactions, necrosis, periostitis, and pin-point sequestra are still met with, especially in the terminal phalanges. There, a soft tissue infection of the volar fat pads traps pus under tension producing at first rarefaction and decalcification, then necrosis and small sequestra of pin-point size which are often overlooked and are a source of delayed healing.

Acute inflammatory lesions[12] are accompanied by hyperemia and increased vascularity, especially in the metaphysis distal to them. The vessels at that point enlarge and erode the Volkmann's and haversian canals with resultant calcium absorption. The articular cortex appears detached by virtue of a thin line of rarefaction below it. This phenomenon of reflex hyperemia and absorption is a feature of certain injuries, infections, tumors and vasomotor instabilities. The local osteoporosis of vascular phenomena must be distinguished from a generalized passive form such as observed in disuse atrophy, or the type of osteoporosis seen in osteomalacia, particularly of the senile type.

Infections of the spine are nearly always limited to one, two or three adjacent vertebrae and, depending upon the virulence of the organism, varying degrees of fusion, either of the bodies or the ligaments and disks, result. It may be stated almost categorically that when only two adjacent vertebrae are fused, the cause has been an inflammatory process and not trauma or so-called osteoarthritis. Gonorrhea, typhoid, staphylococcic and streptococcic infections, and undulant fever are listed among the chief causes.

Syphilis and Tuberculosis.—Both of these are chronic types of inflammation and may be considered together. They are examples of the physiological processes of absorption and replacement of bone. Tuberculosis tends to involve particularly the joint surfaces and the epiphyseal ends of the bones whereas syphilis usually attacks the diaphyses. Tuberculosis is generally an osteoporotic process. Syphilis is a slowly reactive process following the invasion of the spirochetes. In tuberculosis, two processes occur: (1) Granulation tissue formation with the phenomena of hyperemia noted previously, which results in typical caries; (2) caseation necrosis, with the formation of pus and abscess, as noted particularly in spinal tuberculosis.

In tuberculosis, the x-ray picture depends upon the character and extent of the disease. If in the bone proper, it is usually one of erosion. If it affects the joints one finds a hazy enlarged joint with erosions of the ends of the bones and in the later stages, perhaps subluxation of the joints or fibrous union. Unless there is mixed infection, there is no bone reaction, although tuberculous dactylitis may be an exception to this rule.

It is a medical aphorism that lues is protean in its effect. In congenital syphilis, the characteristic lesion is enlargement and irregularity of the epiphyseal line caused by disturbance of the normal endochondral ossification and the presence of syphilitic granulation tissue and perhaps necrosis. The x-ray findings are most important. The epiphyseal line is markedly widened; the ends of the bone are irregular, also the adjacent diaphysis may show a worm-eaten appearance. Sometimes in the early stages a condensation of the diaphyseal line is present. At times this forms a double line. Periosteal thickening is seen. A note of caution in regard to attempting diagnosis by roentgen ray alone is given by Archer[13] who says: "Periosteal thickening or bone destruction of syphilis is indistinguishable radiologically from that of osteomyelitis, rickets and tuberculosis."

In the adult, it has a tendency to involve the diaphyseal ends of the bone and the periosteum. The lesion at first is osteoporotic due to the formation of granulation tissue. Later there is considerable osteoblastic reaction, particularly of the periosteum, so that the presence of periostitis should always arouse suspicion. This leads to the laying down of membranous bone and absorption of the granulation tissue, lessening circulation to the new bone with subsequent sclerosis. Later in the disease gumma may form, and, due to obliterating endarteritis characteristic of syphilis, may ulcerate. When the process of granulation and subsequent osteoblastic activity affects not only the periosteum but the haversian system and endosteum as well, then the entire bone is sclerosed and enlarged and the medulla narrowed.

The film findings would follow the pathologic and physiologic pattern. In the early stages periostitis would be present; later the process would extend to the bone with perhaps early osteoporosis, soon followed by sclerosis. If the entire bone is involved, there is noted periostitis, enlargement of the bone, sclerosis, and narrowing of the medulla. A gumma shows as a localized enlargement of the bone, raising the periosteum and being less dense in character. If it ulcerates, it has the appearance of a cortical abscess with an irregular area having a background of dense bone.

SUMMARY

An attempt has been made to correlate certain phases of physiology with the understanding of x-ray films. I have not tried to cover the entire field of bone disease but have chosen numerous examples to illustrate this point. The greatest difficulty has been the temptation to include many more subjects. If I have been able to stimulate others to see the importance of physiology in their daily interpretation of roentgenograms, then the purpose of this paper has been accomplished.

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Roentgenological Aspects of the Ruptured Intervertebral Disk

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Our profession is in the midst of adjusting itself to much new information concerning spinal structure, especially the intervertebral disk. We have all become cognizant of the many variations in spinal development, and we can readily recognize adaptive and compensatory changes in structure secondary to shifts in weight support. We have all experienced defeat in our efforts to find adequate structural cause for low-back pain associated with extension of pain into one or both legs. The most searching set of x-ray films in anteroposterior, lateral, and right and left oblique directions have failed usually to visualize any definite alterations in intervertebral spacing or the evidence of any osteosclerosis suggestive of reaction to loss of disk function.

A very gratifying advance has been made in the technic of examination of these problem cases by the use of contrast materials injected into the subarachnoid space. There has been a continual search for contrast material which can be injected, easily moved in the spinal subarachnoid space, and, at the end of the examination, retrieved with a minimum of residuum. Pantopaque satisfies the requirements for contrasting space occupying lesions in the spinal canal. Now that it is obtainable, we are certain that there will be a greatly increased use of myelographic examination.

Heretofore, we have used lipiodol with some success, especially in localizing intraspinal tumors so as to guide the neurosurgeon to the proper segment for a laminectomy. These cases were all in such tragic condition that the medicolegal aspects of leaving lipiodol in the spinal canal did not need to be seriously considered. The controversy about the aftereffects of residual lipiodol in the spinal canal has never been settled, and hence no one who employs it for intraspinal contrast can feel justified except on the basis of a very clear understanding between doctor and patient.

The incapacitating pain suffered by many patients exhibiting the now well-defined syndrome of ruptured intervertebral disk will drive the average patient to accede to any means that offers hope of definite relief. We have used lipiodol successfully for visualizing ruptured intervertebral disk and have never had occasion to observe any residual effects of the oil. We have never been able to withdraw any of the lipiodol.

Our experience with air myelography is very limited. As soon as reports were issued about this contrast method, we tried it but did not feel that we could interpret the myelograms with enough certainty to be of real aid to the neurosurgeon. It seems that we were not alone in this failure, because articles began to appear suggesting that when there was a well-defined clinical syndrome, operation was warranted strictly on clinical findings. Every surgeon would, no doubt, prefer to have a clinical syndrome of ruptured intervertebral disk confirmed by a contrast myelogram before operation. We have now reached that stage of development of spinal examination where pantopaque comes to our aid in really clinching a diagnosis and thus aiding the surgeon to operate in a limited field with confidence.

PANTOPAQUE

Pantopaque has several advantages over other opaque oils. The most outstanding of these advantages are ease of injection, quick response to change of gradient in the spinal canal, and recoverability at the end of the examination. No one will fail to appreciate the easy flow of pantopaque when it is heated to body temperature. The period of time required for a pantopaque myelography is much shorter than that required with lipiodol, owing to the free flow of the former in response to the changes in gradient incident to the careful detail of examination.

Spinal puncture carries a possible threat against the well-being of any patient and, therefore, requires every aseptic safeguard. The patient is prepared by a surgical nurse for the spinal puncture by the surgeon. We always request that the puncture be made in the third lumbar space as nearly in the median line as possible.

It has been our experience that there is usually some degree of filling defect in the area of puncture, probably due to tissue stress at the site of penetration of the dura. Since most cases of ruptured disk are at the level of the fourth or fifth lumbar, it is necessary to avoid any procedure which tends to produce an artefact in this region.

Our team consists of the surgeon, roentgenologist, nurse, and technician. The position of the patient depends on habitus, i. e., if there is a considerable lordosis, it is necessary to place a pad of adequate thickness under the patient's abdomen to force the lumbar region into as nearly a straight line as possible. With the patient prone on this pad, the spinal puncture is accomplished with the least amount of repositioning. Some of our surgeons prefer to make the puncture with the patient in the lateral flexed position and then to move him into the prone position.

There is nearly always a history of spinal puncture made at some previous examination by some other doctor. If no previous examination has been made, the surgeon will insist upon testing intraspinal pressure. Fluid is withdrawn for laboratory tests. Three cc. of pantopaque are injected. This amount is doubled at times. Some roentgenologists claim 6 cc. furnish a more satisfactory test of filling defects; for example, when there are multiple disk ruptures. The larger amount of opaque oil visualizes three or more disk levels at one time and expands the subarachnoid space.

EXAMINATION TECHNIC

As soon as the injection is accomplished, the roentgenologist takes command and proceeds to make certain preparations for safeguarding the patient during the fluroscoping and spot filming in various positions. The first step is to be sure there is no danger of touching the spinal needle with the fluoroscopic

screen. We use a balsa wood block 15 by 10 by 5 cm. with a hole in its center 1 cm. in diameter. This block is sterilized like all other material used with respect to the puncture. The hole in the balsa block receives the protruding spinal needle. A sterile towel covers the block. Adhesive straps fasten the block securely to the patient's body. With this safeguard, spot films may be placed directly on the block with the fluoroscope resting upon the cassette.

Flowing the pantopaque into the spinal subarachnoid space requires patience. This is especially true if the patient is naturally lordotic in the lumbar region and compensatorily kyphotic in the thoracic region. The lumbar portion of the spine seldom offers difficulty when the examination is confined to that region, but when the surgeon wants the cervical region examined, we may find that a table that permits only 10 degrees of cephalad tilt is inadequate to flow the oil over the dorsal kyphosis. In such a case it is necessary to reverse the patient's position on the table to secure a greater tilt. Having gained an adequate slope the oil is apt to move so rapidly into the cervical region that it is difficult to control it, and some of it may pass through the foramen magnum. If any passes through the foramen, it can not be retrieved. We recently had a patient referred for reexamination who had been examined elsewhere 6 months previously. A lateral exposure of his head showed opaque oil in the posterior and middle fossae. The oil had not produced any symptoms.

Our myelographic examinations require about 20 to 30 minutes from start to finish. The amount of x-ray exposure does not carry any threat against the patient. Eye accommodation of the operator should be at its best so he may recognize quickly the character of the filling and movement of the pantopaque. During the period of surgical preparation, puncture, and injection, the roentgenologist should keep his eyes thoroughly protected so that there shall be no delay in accommodation.

The speed with which pantopaque can be flowed greatly shortens the period of examination. If one first fills the lower end of the subarachnoid space, he can note the terminal level. There is much variation with respect to this level and also with respect to the width of the space. We should expect to find developmental variations in this field of examination as in the osseous. We make spot films of the filled subarachnoid in the direct anteroposterior and oblique directions with the patient upright at 90 degrees. These are made irrespective of failure to recognize anything fluoroscopically suggestive of pathology. Having the whole of the pantopaque in one mass shadow makes it easy to flow it in the cephalad direction when the table is leveled to pool the material in the area of the lower lumbar disks. This stage of the examination is highly critical. By tilting the patient laterally so that observation can be made in the oblique direction, we can usually see any filling defect in the ventral aspect of the column of pantopaque. By elevating or depressing the head of the table, we can make the opaque oil flow across a suspected disk. If any filling defects are revealed by the opaque oil, spot films are made. We make whatever spot films seem necessary to demonstrate the lesion if such is recognized fluoroscopically.

We have found that when an examination of the cervical region is performed, the technic is greatly complicated by the dorsal kyphosis even when the curve is comparatively normal. It is difficult to flow the opaque oil in mass over the hump and hold it under control in the cervical region so as to secure a satisfactory filling of the broad subarachnoid space. If examination of this area is contemplated, it is advisable to have the surgeon inject 6 cc. of pantopaque instead of the usual 3 cc. which are adequate for the lumbar region.

If the roentgenologist can keep the contrast medium from breaking up into globules, he will greatly shorten the period of examination and not be confused by the pattern of disassociated globules of oil.

Most of the cases requiring myelography have a ruptured disk syndrome, and hence the roentgenologist is keen to visualize a space-occupying lesion in such a definite manner that there is practically no doubt of its existence. It is hard to conceive of a ruptured disk without its having some sort of associated tissue changes. All of these cases show positive resistance to straight-leg flexion at the hip. This appears to indicate an increase of nerve root pressure due to compression produced by flexion of the lumbosacral region. Oblique exposures of this region may show filling defects on both the anterior and posterior aspects of the column of opaque oil. The positions of these filling defects may mean a disk protrusion and a thickening of the ligamentum subflavum. Either of these conditions could be the space-occupying lesion producing the symptom complex.

In some of our patients in the fifth decade of life we have found that we could not maintain a solid oil shadow. It was broken by a network of clear paths. At operation this pattern was found to be caused by varices.

Those individuals who exhibit lumbar joint changes rarely present the clinical syndrome of ruptured disk. The changes which we visualize without contrast media indicate reaction of repair and adaptation which means that the structure has experienced a long period of disability. We are very apt to find filling defects on the ventral aspect of a column of pantopaque in all such persons due to age changes in the spinal structure. These changes are seldom located in a single disk area.

The patients most likely to present a positive filling defect on the ventral lateral aspect of the pantopaque shadow do not show any structural changes on scout anteroposterior and lateral films. They are usually in the third or fourth decade. They present a syndrome of fourth or fifth spinal root pressure. The symptoms are severe and unyielding to therapies. These patients are definitely improved by surgical excision of the protruding nuclear substance of the ruptured disk.

SUMMARY

Another advance has been achieved in the differential diagnosis of causes of low-back pain and sciatica. The use of pantopaque for contrast myelography is increasing rapidly.

We have outlined a technic of examination employing apparatus of comparatively simple construction thus placing this important type of examination within the capacity of all small hospitals having a tilting fluoroscopic table.

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X-Ray Therapy of Spondylitis and the Arthritides

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No unified agreement exists today in the treatment of rheumatic diseases except that regarding the recently developed methods of chemotherapy for controlling most of the acute bacterial infections affecting joints. This is easily understandable because the cause for the common forms of rheumatism has not been ascertained. Consequently, therapeutic procedures are based entirely upon empirical formulae. In this category belongs roentgen therapy.

Insofar as the purpose of this paper is to discuss some of the practical considerations of roentgen therapy of spondylitis and other arthritic manifestations, it behooves us to clarify the term, rheumatoid arthritis. By this we mean the Marie-Strümpell type of spondylitis rhizomelica, not that commonly referred to as chronic hypertrophic osteoarthritis. This term (hypertrophic arthritis) has been, and still is being, used relative to the marginal changes found about the bodies of the vertebrae. For these conditions the Germans have always used the term, arthritis deformans; the English, osteoarthritis; while the accepted American term has been, for some time, hypertrophic arthritis.

As far as roentgenologists are concerned, the term, hypertrophic arthritis, should not be used. It has no foundation of fact; it is not accurate, and it has not the pathological basis to substantiate its use. The accepted definition of arthritis is inflammation of a true joint, while a true joint is properly defined as one with a secreting synovial membrane. If, then, these two definitions are correct, the term, hypertrophic arthritis, has no place in our nomenclature relative to marginal changes of and about the bodies of the vertebrae. A designation that would be proper and which has fundamental basis in fact is hypertrophic changes.

The only time the word, arthritis, should be used relative to the vertebrae is in cases where the Marie-Strümpell type of arthritis exists This is the only true form of arthritis that involves the vertebrae, the articular processes being primarily affected. The articular process is the only portion of the spinal segment that has a secreting synovial membrane. Later on, advanced changes may involve the ligaments, and eventually, as the disease progresses, produce calcification of all intervertebral cartilages.

There may be a question concerning the diagnosis of rheumatoid arthritis of the spine in patients with early disease who show changes in the sacroiliac joints as the only roentgenographic abnormality. It has been emphasized that sacroiliac arthritis often is the earliest roentgenological sign of this disease. However, it does not necessarily signify the inevitable development of spinal arthritis. In sacroiliac arthritis the existence of marked restriction of spinal motion in the lumbar and even the thoracic region, gross diminution in chest expansion, progressive loss of weight and disability, together with elevation of erythrocyte sedimentation rate are characteristic of rheumatoid arthritis.

Pathologically, in the early stages, the cartilage may appear quite normal and the only visible change may be in the synovial membrane. This is hyperemic and edematous and an effusion is present, as well as periarticular soft-tissue swelling. The edematous phase is followed by signs of an inflammation of a more chronic nature. Fibrin is precipitated and tends to cause adhesions. The synovia becomes thickened because almost from the beginning there is a constant increase in the number of fibroblasts. The lymphatics are obliterated causing a retention of intra-articular fluid. This stage passes imperceptibly into that of a hyperplastic change. Thus, the first stage is characterized pathologically by a succession of edema, chronic inflammation, and hyperplasia of the synovial membrane.

The second stage is marked by the formation of granulomatous tissue. This tissue is composed of lymphocytes and their derivatives. It fills the joint spaces with a pannus and then covers the articular cartilages, binding them together and eventually destroying them. At the same time, the granulomatous tissue is gradually transformed into a fibrous tissue, resembling in this respect a keloid tissue. It is the presence of the granulation tissue which gives rise to the designation, proliferative arthritis.

The third stage is that of destruction of the cartilages and their replacement either by fibrotic strands or osteoid tissue, with complete ankylosis as the end result.

The value of x-ray therapy for spondylitis and other forms of rheumatic disease has long been recognized by radiologists. Smyth, Freyberg, and Peck[1] cite the effects of such therapy as discussed by Sokolow, Stenbeck, and Anders, Daland and Pfahler, and the generally favorable reports of Kohler, Kreuzwald, Kraus, Kahlmeter, von Pannewitz and others which have stimulated a considerable interest in the exploration of this form of therapy.

Although the standards of dosage in the treatment of rheumatoid arthritis may vary somewhat by different operators, the essential features, such as depth dose percentage, r units per port and filtration are preserved by all investigators.

The technic of Borak and Taylor[2] is promulgated on the basis of the pathological differences in the various stages of the disease, i. e.,

"Inflammatory edema . . . 50-100 r depth dose in 1 session.
Chronic inflammation . . . 200-300 r in 1 to 3 sessions.
Hyperplasia . . . . . 800-1,200 r in about 3 weeks.
Granulomatous tissue . . 1,200-1,600 r in about 3 weeks."

The factors used were 200 kv.; 20 ma.; 50 cm. distance; 0.5 mm. copper plus 1.0 aluminum filtration with a half value layer of 0.9 mm. copper.

In 1935, Scott[3] reported that "wide field" roentgen irradiation was beneficial to patients with "spondylitis adolescens." In subsequent reports, this author has claimed remarkable results with such therapy and has summarized results in more than 400 cases in which treatment was given in various stages of this disease. Patients with early disease responded best and often became symptom free within a few months.

Three groups of cases in Scott's series are represented on the basis of their x-ray changes:

(1) Early: The changes are limited to the sacroiliac joints, which present a marked thinning of both joint spaces with irregularity of the borders and increased irregularity of the adjacent bone and slight generalized osteoporosis.

(2) Moderately advanced: Those with partly or completely obliterated sacroiliac joints and with calcification of the longitudinal spinal ligaments over several segments.

(3) Far advanced: The sacroiliac synchondroses are completely ankylosed and extensive paravertebral ligamentous calcification has ensued.

The technic as employed in this "wide field" irradiation is the utilization of a special wide angle x-ray tube to deliver a "roentgen ray bath" to the whole trunk, front and back, which is covered by two overlapping 12 inch fields. The physical factors are 140 kv.; 5 ma.; 3 mm. aluminum filter; 43 cm. distance; with 60-100 r output. The first series is given twice a week for 8 weeks. There is an interval of 6 weeks when the patient does not receive treatment, then a second series is given twice a week for 6 weeks. There is another interval of 6 weeks, then the third series is given once a week for 6 weeks.

Considerable work in paravertebral irradiation has been done by Lloyd[4] of Philadelphia who from 1927 to 1932 used an intermediate technic of 140 kv.; 4 ma.; 40 cm. distance and a filter of ¼ mm. copper plus 1 mm. aluminum with a dosage of 100 r to each of two portals per sitting. The patient was treated every 3 or 4 days until each port had received a total of 500 r. Since 1932 Lloyd has employed a technic using 200 kv.; 25 ma.; 50 cm. distance; added filter, 0.5 mm. copper plus 1 mm. aluminum; half value layer of 0.95 copper; total r per port 600 (in air).[5] Although the method used by Lloyd is not specifically that for rheumatoid arthritis, but is given to influence the vegetative nervous system, we feel that the rationale is sufficiently sound to warrant mention at this time.

Freyberg,[6] in his treatment of rheumatoid arthritis, divided the back into five portals and treated the patient every day for 7 days, alternating treatments over portals until each received three treatments of 200 r (measured in air), a total of 600 r to each portal. Factors were 200 kv.; 0.5 mm. copper plus 1 mm. aluminum with a half value layer of 0.9 mm. copper at 50 cm. skin-target distance and an output of 50 r per minute. During the latter part of this treatment and for 3 days afterward, the patient experienced considerable nausea and anorexia but no vomiting. Beginning the week following treatment, pain gradually lessened and an increase in back motions was noted by the patient. Two subsequent series of treatments 4 and 5 weeks apart were also given, employing the same technical factors. Progressively increasing comfort to the patient, and greater mobility of the spine followed each course. Although the end results were considered excellent and illustrated the benefits that roentgen therapy may provide to patients treated adequately in spondylitis rhizomelica, the coexisting gastrointestinal irritation during and following treatment, and the leukopenia encountered necessitated a change in the treatment schedule and lowering of the factors employed previously.

It seems apparent that the utilization of an intermediate dosage of 140 kv.; 10 ma.; at a 50 cm. distance and using a filter of ¼ mm. copper plus 1 mm. aluminum with an output of 150 r per port and with a total output of about 450 r, is to the best interests of the patient. There is a diminution in the adverse gastrointestinal manifestations, and the chance of leukopenia occurring is rare.

As a rule, this disease occurs primarily in the male, which is fortunate, inasmuch as roentgen irradiation over the pelvis in the female may cause suppression of ovarian function in the childbearing period. No untoward effect on male gonads has been observed.

The exact physiology of x-ray therapy in spondylitis is not clear, but there is no doubt that it acts as a depressant to the vegetative nervous system and also possesses an analgesic effect on the back muscles and their attachments to the spine. Roentgenographically, however, there is no evidence of anatomic improvement. As a matter of fact, there is an increase in calcification of the paravertebral ligaments.

As regards the use of roentgen therapy in the treatment of other rheumatic conditions throughout the body, the reports are, on the whole, unfavorable. One would rightfully expect that insofar as x-ray therapy is of value in spondylitis (Marie-Strümpell arthritis), the same good results should be envisioned in rheumatoid arthritis of the joints of the extremities. However, the reports are very discouraging, except in cases where a psychic effect is desired. Perhaps the reason for this negative outlook is that local treatment is being administered for a constitutional disease in which category rheumatoid arthritis most emphatically falls.

Many patients have been treated for hypertrophic changes of the spinal segments and some have obtained temporary relief from pain but in most instances no subjective or objective benefits were noted. Perhaps the rationale for the improvement in some cases is due to a beneficial effect on a secondary fibrosis rather than on the true condition itself.

In the group of cases with different forms of nonarticular rheumatism, such as fibrositis, subacromial bursitis, periarthritis, painful tendon attachments and palmar or plantar fasciitis, x-ray therapy has produced sufficiently good results to warrant a continuance of this regime in the aforementioned entities. Roentgen irradiation of subacromial bursitis has proved, in fact, to be a most successful procedure in our own practice.

SUMMARY

Roentgen therapy has given better and quicker relief of pain and stiffness in spondylitis than any

other form of treatment. Benefits accrued from this avenue of approach have persisted for many years. The earlier treatment is inaugurated, the better the end result.

Rheumatoid arthritis of the joints of the extremities has shown poor response and in the treatment of hypertrophic changes of the spine the response has also been negligible. However, considerable relief from pain has followed x-ray therapy in the nonarticular types of rheumatism. Therefore, it is my conclusion that roentgen therapy should be considered a definite part of the therapeutic regime for certain forms of arthritis and its limitations appreciated.

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Classification of Tumors with Reference to Radiosensitivity

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Malignancy is the second leading cause of death. We are dealing with an important subject. A better understanding of the classification of tumors is needed by pathologist, surgeon, radiologist, and clinician. Early diagnosis of malignancy and proper mode of early treatment are of paramount importance in control of cancer.

Classification of tumors is based upon the tissue of origin as connective, epithelial, blood, muscular, nervous, and their subdivisions. These divisions have been finely, but not completely, defined by the histopathologist. But the selection of proper treatment depends not only upon classification but also upon clinical factors such as age and physical condition of the patient, the duration and gross appearance of the tumor, and its anatomical location as well as its degree of spread. The best clinical judgment of the physician is challenged to the end that lives may be saved or prolonged and suffering alleviated.

The body is composed of cells, tissues, and organs. Each structure has become differentiated to perform a special or assigned function. The differentiation of function is dependent upon differentiation of structure. Cells, tissues, and organs function differently because they are constructed differently. If they had identical structure, they would function identically. But in the human body differentiation of function and structure go hand in hand from the organ to the finest molecular division of the protoplasm until the entire organism functions as a unit.

The body, with its coordination of systems of organs and function, is a masterpiece of unity and the key to it all is differentiation of structure. The biological opponent of differentiation is growth. When cells are not harnessed in their environment and forced to work, their only function is growth. Cell division and useful function are not possible at the same time. The more highly differentiated a cell becomes, the less its powers of growth by multiplication. The nerve cell is considered a most highly differentiated cell, and it does not multiply by mitosis. We continue through life with the same nerve cells.

The converse may be stated: That the more undifferentiated the cell, the greater its power of reproduction. The lymphoblast is a most undifferentiated cell and its powers of reproduction are great. In tissue cultures, cells from the dead body may be made to grow and multiply almost indefinitely, so long as nutrition is furnished. There they are not harnessed for any useful function. Differentiation and growth are balanced and controlled normally by the anterior portion of the pituitary, favoring growth, and the thyroid and gonads on the side of differentiation with a background of heredity. We do not understand normal growth and differentiation. Much less do we understand abnormal growth and differentiation.

A tumor is an autonomous growth. In politics autonomy means self-governing. As regards tissues, it means that the factors that had previously held them in definite differentiation and purposeful function have been removed, and the influences of growth are left unopposed.

These undifferentiated new growths contribute nothing to the welfare of the body as a whole but demand nutrition from it. The method of metabolism is changed from respiration to glycolysis in which oxygen is not consumed but lactic acid is changed to sugar. Why a tissue that normally used oxygen now refuses it and demands lactic acid is hard to understand.

Tumors may be classified as begnign or malignant. The benign tumor is relatively differentiated. It disturbs the body by pressure on adjacent organs, by demanding nutrition, and by deforming the figure. A tumor attached by a narrow pedicle or encapsulated is likely to be benign.

The malignant tumor is undifferentiated in structure. Its cut surface is homogenous or friable. It grows rapidly, frequently outgrowing the blood supply which causes degeneration; or the vessels may be thin, allowing for hemorrhage. It becomes ulcerated, inflamed, and bleeds easily and spontaneously.

Malignant tumors are attached to normal tissues by a broad base. They are usually not encapsulated. They occlude natural passages. They recur after removal. They spread by direct infiltration and extension and by metastasis through blood and lymph. They cause anemia by hemorrhage and by toxemia, the latter resulting from infection and destroyed tissue which inhibit the function of hemopoietic tissues. The fever and leukocytosis are caused by inflammation and absorption of foreign proteins. The appetite is destroyed by the toxemia and pain. Starvation contributes much to death in malignancy. Malignant tumors will kill the patient regardless of anatomic location unless adequately treated.

Tumors may be graded by the method of Broders: Grade I is the most benign and differentiated; Grade IV is the most malignant and undifferentiated. The purpose of grading is to determine the degree of undifferentiation.

They are graded on the three microscopical evidences of malignancy: anaplasia, hyperchromatism, and number of mitotic figures. If, by actual count, 0 to 25 per cent of the cells are undifferentiated, it is Grade I; 25 to 50 per cent undifferentiated, Grade II; 50 to 75 per cent undifferentiated, Grade III; 75 to 100 per cent undifferentiated, Grade IV.

The most malignant part of the tumor should be examined. A tumor is as malignant as its most malignant part. Grading of tumors is a means of identifying their malignancy on a common basis for the information of the pathologist, surgeon, radiologist, and all others concerned. The rule is, that the more undifferentiated a tumor, the more radiosensitive it is. Therefore, tumors of Grade III and IV would be more radiosensitive than tumors of Grade I and II. The grade has little to do with the prognosis, as the tumor of low malignancy may have metastasized to other organs. A Grade I malignancy will kill the patient just as surely as a Grade IV.

If the grade of the tumor were the only factor to be considered in choice of therapy, the problem would be simple. But the location, size, duration of growth, gross character of the tumor, degree of infiltration, and presence of metastasis must be considered as well as the age and physical condition of the patient.

Rapidly growing and multiplying cells are most sensitive to radiation. Cells are most vulnerable during and just preceding mitosis. In rapidly growing tumors, mitosis is frequent; therefore, the action of the rays is most marked. Granulation tissue, embryonal tissue, as in ovary and testicle, or undifferentiated tumors are radiosensitive. The nucleus undergoes chromatolysis. Since the nucleus controls the metabolism of the cytoplasm, the latter becomes vacuolated and disappears.

The power of the cell to undergo mitosis may be destroyed by radiation during the resting stage of the cell. Tissue cultures following radiation will not grow well when transplanted and will finally die. The full effect of an x-ray burn is delayed because the functioning cells are not destroyed; but their power of multiplication is damaged or destroyed. So when life of the cells is done, there are no rejuvenated daughter cells to carry on. Radiation causes cell autolysis and growth restraint.

Tumor cells are dependent upon their stroma for their blood supply. Radiation is an irritant to the stroma, resulting in fibrosis and obliteration of vessels. Rapidly growing tumors frequently outgrow their blood supply and undergo partial degeneration. With diminution of blood supply from radiation, degeneration is more rapid. The damage to the tumor cells is partly through direct action on the cells and partly through lessened blood supply. Lymphatic vessels are closed and spread of a tumor by emboli is less likely during radiation. Radiosensitive tumors invading bone or fat respond less readily to radiation. An infected tumor is radioresistant and radiation destroys resistance to infection.

Tumors are classified on the basis of origin and graded as to degree of malignancy and radiosensitivity. Since the cause of tumors is not known, classification on that basis is of no value. It is likely when the cause of tumors is correctly evaluated, there will be multiple agents as many irritants may cause inflammation.

Every cell arises from a pre-existing cell and the cell of origin is the most accurate basis of classification. Radiosensitivity and malignancy are more variable or possibly less is known about them. The following classification is based upon cell of origin and approximate range of radiosensitivity, remembering the rule that the more undifferentiated a tumor, the more radiosensitive.

The benign connective tissue tumors are the fibroma, lipoma, myxoma, chondroma, and osteoma. Their corresponding malignant tumors are fibrosarcoma, liposarcoma, myxosarcoma, and osteogenic sarcoma. As a class, they are highly radioresistant.

The leiomyoma or fibroid is a benign tumor of smooth muscle and radiation may cause liquefaction. The leiomyosarcoma is the malignant tumor. About 1 or 2 per cent of fibroids undergo malignant change. Arising from the highly differentiated smooth muscle and its dense stroma, we would judge it to be radioresistant.

Tumors of the hematopoietic tissues are undifferentiated and radiosensitive.

Tumors arising from the lymphoid tissue are lymphosarcoma and lymphatic leukemia. Lymphosarcoma arises in a group of lymph nodes and spreads to another by direct continuity. It is frequently not diagnosed until it involves the tonsils and lymph nodes of the neck. But usually it has already invaded the thoracic and abdominal nodes with splenic enlargement. There is anemia and lymphocytosis but there is no pathognomonic blood picture. At the termination of the disease the blood picture may be that of lymphatic leukemia.

It is thought that the pathological process of lymphosarcoma and lymphatic leukemia is fundamentally the same. Lymphosarcoma is an aleukemic tumor, the premature lymphocytes do not appear in the blood until late; while in lymphatic leukemia, the immature lymphocytes are in the blood stream from the beginning.

Lymphatic leukemia may be diagnosed by the blood picture. The widespread involvement of the lymphoid tissues in both conditions is much the same. In lymphatic leukemia, radiation will reduce the white count rapidly by its action on the lymphoid tissues. It lessens suffering and no doubt prolongs life, but the condition is a malignancy of the lymphoid tissues and death is the result.

At autopsy, tumors of the lymphoid organs are found the cells of which are round and undifferentiated. The kidneys and liver are densely crowded with lymphocytes so that renal and hepatic insufficiency must contribute much to the cause of death. In lymphatic leukemia the number of lymphocytes in the blood stream is small compared with that in the tissues. Their number in the blood is a poor standard for basis of a prognosis. In fact, a too rapid reduction by too energetic radiation is to be guarded against. But tumors of the lymphoid tissue illustrate the rule well, that the more undifferentiated a tissue is, the more radiosensitive it is.

There is some dispute as to whether or not Hodgkin's disease is a tumor, but it involves the

lymphoid organs. The greatest enlargements may be in the thorax or abdomen, but the disease is frequently not diagnosed until it involves the glands of the neck. There is no pathognomonic blood picture. The disease is fatal.

Tumors of the myeloblastic tissues involving the bone marrow are myelogenous leukemia, multiple myeloma, and Ewing's tumor. All these tumors are composed of undifferentiated cells and should be radiosensitive.

The pigmented tumors are the nevus and the malignant melanoma. The nevus is benign and relatively differentiated. The great danger of it is that it might undergo malignant change. A microscopic examination should be made before removing it with an electric needle. We have had two cases in the last year of malignant melanoma each with a history of removal of an apparently benign nevus a few months previously.

About one-third of the cases of malignant melanoma occur primarily in the choroid of the eye. The majority of the remainder occur in the skin. They metastasize to the skin readily. We have found them not only in the skin, but also in the submaxillary gland and underneath the sternum. They are considered highly radioresistant.

Tumors of the central nervous system may originate from the nerve cells, the nerve fibrils, or from glial tissue—the interstitial tissue of the central nervous system. They originate from highly differentiated cells and, according to the rule, they are radioresistant.

The neuroblastoma is a tumor arising from nerve cells, but it does not occur in the central nervous system. It comes from the cells of the medulla of the adrenal gland or from sympathetic nerves of the abdomen. It is confined to children and may grow to great size. We have never found this tumor at autopsy.

The retinoblastoma arises from neuroblasts of the retina. It is confined to children and is frequently bilateral. We have had one such tumor. The eye was enucleated.

The glioblastoma originates from the glial cells. It is a malignant tumor of mid-life, usually confined to the cerebral lobes. It is localized but not encapsulated and usually has a degenerated center. It does not metastasize. It causes increased intracranial pressure with papillary edema and headache. Our most recent patient with such a tumor lived about 6 months after the diagnosis of brain tumor had been made. At autopsy, the tumor was found to involve both occipital lobes and intervening corpus callosum.

In another case at autopsy we found a meningioma growing from the falx cerebri. It was 4 cm. in diameter and had grown between the cerebellum and the occipital lobe. The patient, a woman, had incoordination of her lower extremities.

A plexiform neuroma involving the olfactory bulbs was demonstrated in a woman whose sense of smell had been destroyed a few years before death. She died of cerebral thrombosis and pneumonia.

We found an adenocarcinoma of the hypophysis in a man 34 years old. It involved the second, third, fourth, fifth, and sixth cranial nerves. It had not invaded the brain, but had destroyed the body of the sphenoid bone and had invaded the sphenoid sinuses. His symptoms were motor paralysis of the extrinsic and intrinsic muscles of the eye with blindness, and sensory paralysis of that portion of the face supplied by the mandibular division of the fifth nerve. He lived 4 months after his first complaint.

In order of frequency of malignant tumors, those originating from epithelial tissue stand first. They are more frequent than all other tumors combined. Epithelium covers the surface of the body, lines the cavities and ducts, and forms glands. The character of this epithelium varies greatly according to its function, but carcinoma may originate from any of it.

The squamous or pavement-cell type covers the surface of the body, and, generally speaking, lines the cavities opening on it, including the nasopharynx, esophagus, larynx, and urinary bladder. The benign tumor originating from this epithelium is a papilloma. The malignant tumor originating from this epithelium is termed squamous cell carcinoma. These tumors are moderately radiosensitive, depending upon their degree of anaplasia. Squamous cell carcinoma of the cervix of the uterus and of the lip are the most frequent examples.

Carcinoma of the cervix is the most frequent malignant tumor of the female. About 96 per cent of these tumors are of the squamous cell type. They follow chronic cervicitis in women who have borne children. In chronic cervicitis, the simple epithelium of the endocervix displaces the stratified epithelium of the portio vaginalis. Finally, the stratified epithelium undergoes malignant change. It invades the cervical stroma and adjacent organs as the urinary bladder and ureters. It spreads to the pelvic lymph nodes. We have seen it cause death by occlusion of both ureters with anuria. Early diagnosis is the most valuable means of its control.

Basal cell carcinoma arises from the basal layers of the epidermis. Its usual location is the face or scalp. It is of slow growth and invasion is to a uniform depth with partial encapsulation. It is undifferentiated and radiosensitive. If it invades the bones, it becomes radioresistant.

The lymphoepithelioma is a very radiosensitive tumor that arises from the thinner layers of epithelium that cover the tonsils or other lymphoid tissue of the nasopharynx. The original tumor remains small but spreads rapidly to the glands of the neck.

Glandular epithelium is more differentiated than squamous epithelium. Therefore tumors arising from the former are more radioresistant. The benign tumor is called adenoma. The malignant tumor is an adenocarcinoma. The more frequent sites of adenocarcinoma are the stomach, sigmoid, rectum, breast, pancreas, prostate, thyroid, and gallbladder.

Adenocarcinoma of the stomach spreads by direct extension through the mesentery, limiting the movement of the intestines, causing stasis, obstruction, and peritonitis. Tumor cells become implanted on the peritoneal surface. It metastasizes to the regional lymph nodes and to the liver. Since the tumor is radioresistant and since radiation of the epigastrium damages the liver and pancreas with resulting systemic disturbances, radiation to gastric carcinoma is of limited value.

In 70 per cent of the cases of carcinoma of the prostate the disease has spread beyond operative fields before the diagnosis is made. We have seen cases in which the bladder, pelvic lymph nodes, and the liver were involved.

Adenocarcinoma of the head of the pancreas occludes the bile ducts, causing a deep jaundice. It practically occludes the duodenum. It is a tremendous

epigastric tumor. We have demonstrated its spread to the lungs and the liver.

Scirrhous carcinoma is the most frequent malignant tumor of the breast. Its stroma is of dense fibrous tissue. It spreads to axillary, supraclavicular, substernal, or peritracheal lymph nodes and to bones. The tumor is radioresistant, but radiation should help to prevent spread by obliteration of lymphatics.

There are several mixed tumors: Wilms' tumor of the kidney is an adenosarcoma. It is the commonest malignant tumor of childhood. We have had one case in which the disease spread to spleen and liver.

Teratoid tumors are attempts to form a new individual within the tissues of the host. Their most frequent location is in either the ovary or testicle. These misplaced tissues have no function. Their great danger is that they may undergo malignant change. In the dermoid cyst of the ovary, we have found teeth, hair, skin, renal and liver epithelium, glands of the gastrointestinal tract and heart muscle. In the teratoma of the testicle, we have found cartilage, lymphoid tissue, smooth muscle, and glandular epithelium. In case of malignant change, radiation would check the growth of the more undifferentiated elements. It is of interest to note that embryonal carcinoma of the testicle gives a positive Friedman test.

Boyd[1] says that "Malignant tumors may be divided according to their radiosensitivity into three main groups: (1) highly radiosensitive: lymphosarcoma, multiple myeloma, lympheopithelioma (transitional-cell carcinoma), embryonal carcinoma; (2) moderately radiosensitive: epidermoid carcinoma, carcinoma simplex, depending in each case on the degree of anaplasia; (3) highly radioresistant: fibrosarcoma, osteosarcoma, neurosarcoma, melanoma, glioma, adenocarcinoma (except adenocarcinoma of the thyroid)." Of course the diagnosis of malignancy must be positive before radiation therapy. The destruction of proteins within the body by radiation causes systemic disturbances.

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REFERENCE

1. Boyd, W.: Text-book of pathology. Ed. 4. Lea & Febiger, Philadelphia, 1943, p. 272.

Research on Cancer in the Orient

OWEN W. LINDSAY, D.O., F.A.O.C.R.
Los Angeles

The amount of research on cancer in the orient that was carried on by the United States prior to World War II was apparently confined to the study of hospital records and reports of physicians inside the countries in question.[1] The accuracy of statistics taken in this manner has been questioned by various authorities, particularly by C. Bonne[2] who said, "In the study of the geographic distribution of cancer we cannot, therefore, simply take a number of hospital returns from various tropical countries, compare the number of cancer deaths, and from these compile figures to be used as an indication of the relative amount of cancer in the countries studied. Even if all the diagnoses were controlled by post-mortem studies, we would still have an important source of error in the various stages of development of the different populations and the degrees to which western medicine had penetrated."

Bear in mind that the report of the research on cancer in the orient that I am now giving you is not the data gathered by a nationally financed organization as you might expect. It is, on the contrary, based on the findings from my on-the-scene association with one of the most representative peoples of the orient—the natives of Okinawa.

World War II found me a part of the invasion forces upon the shores of these hitherto uninvaded islands which are inhabited by a cross section of Chinese, Korean, Formosan and Japanese people. The following summary of their environment aids in the final analysis of my research:

A. Living quarters:
   (1) Thatched huts, (2) wooden floors and grass mats, (3) brick fireplaces, (4) pigsty combined with toilet facilities.

B. Clothing:
   (1) Kimonos around the home, (2) pajamas in the field, (3) wooden shoes and straw sandals.

C. Sanitation:
   (1) Negligent—flies and fleas abundant, (2) no scalding of dishes after eating, (3) no supervised garbage disposal, (4) no latrine facilities, (5) wells contaminated from surface run-off. (Herein lies the basis for the intestinal infections present among the entire population; it was found to be the greatest single factor in the cause of death of 500 patients on whom postmortem examinations were carried out in a period of 8 weeks.)

D. Culture:
   (1) High schooling—with teaching of nursing and farming as major subjects, (2) religion—Shintoism and Christianity among those of Chinese origin, (3) moral code—strict marital relations; the girls are not even given in marriage until the age of 21; divorces are unheard of, and venereal disease is almost negligible. (Could these latter findings account for the low mortality rate in malignancy of the female breast and generative organs? In several thousand women examined no breast cancer was found.)

E. Diseases:
   (1) Filariasis: 20 per cent of population infected, (2) leprosy: one colony of approximately 100, (3) tuberculosis, very fatal type, (4) intestinal parasites: too numerous to mention, (5) no evidence of arthritis, (6) no evidence of vascular hypertension, (7) no calcification of the vascular system, (8) no evidence of rheumatic disease.

The total number of persons examined in a 6-month period of this survey was approximately 50,000. The incidence of cancer among this number totalled 1 per cent. These findings support the general opinion that cancer is a rare disease among primitive races.[3]

3039 W. Seventh St.

REFERENCES

1. Hoffman, F. L.: Mortality from cancer throughout the world. Prudential Press, Newark, N. J., 1915.

2. Bonne, C.: Cancer and human races. Am. J. Cancer 30:435-454, July 1939.

3. Bonne, C.: *Loc. cit.*, ref. 2.

Conventions and Meetings

Announcements

American Osteopathic Association, Annual Meeting, Chicago, July 21-25 inclusive. Program Chairman, Murray D. Weaver, Ontario, Cal.

Academy of Applied Osteopathy, Hotel Stevens, Chicago, July 18, 19. Program Chairman, Ralph W. Rice, Los Angeles.

American Association of Osteopathic Colleges, Chicago, July 18-20.

American Association of Osteopathic Examiners, Chicago, July 22.

American College of Osteopathic Internists, Del Prado Hotel, Chicago, July 17-19. Program Chairman, Charles Worrell, Palmyra, Pa.

American College of Osteopathic Obstetricians, Chicago, July 19, 20.

American College of Osteopathic Pediatricians, Chicago, July 20 and 22.

American College of Osteopathic Surgeons, Hotel Biltmore, Los Angeles, October 20-23. Program Chairman, Lucius B. Faires, Los Angeles.

American Osteopathic College of Radiology. Combined sessions with American College of Osteopathic Surgeons, Los Angeles, October 20-23.

American Osteopathic Hospital Association, Combined Sessions with American Osteopathic College of Surgeons, Los Angeles, October 20-23.

American Osteopathic Society of Herniologists, Morton Hotel, Grand Rapids, Mich., July 19, 20.

American Osteopathic Society of Proctology, Hotel Statler, Boston, May 13-16. Program Chairman, J. J. Cronin, Boston.

Arizona, Westward Ho Hotel, Phoenix, May 3, 4.

Auxiliary to the American Osteopathic Association, Chicago, July 21-25.

British Columbia: See Northwestern.

California, Hotel del Coronado, Coronado, May 14-17. Program Chairman, Russell M. Husted, Long Beach.

Child Health Conference, Municipal Auditorium, Kansas City, Mo., April 14-16. Program Chairman, F. W. Thompson, Kansas City, Mo.

Colorado, Shirley-Savoy Hotel, Denver, April 26, 27.

Eastern Osteopathic Association, April 12, 13. Program Chairman, Chester D. Losee, Westfield, N. J.

Florida and Georgia, George Washington Hotel, Jacksonville, May 22-24. Program Chairmen, J. A. Camara and Paul E. Duffé, both of Jacksonville.

Georgia: See Florida.

Idaho: See Northwestern.

Illinois, Pere Marquette Hotel, Peoria, May 2-4. Program Chairman, L. A. Browning, Bloomington.

Indiana, Hotel Antlers, Indianapolis, May 9, 10. Program Chairman, Fred L. Swope, Richmond.

Iowa, Hotel Ft. Des Moines, Des Moines, May 12, 13. Program Chairman, J. R. Forbes, Des Moines.

Louisiana, Baton Rouge, October. Program Chairman, J. R. Kidwell, Baton Rouge.

Michigan, Civic Auditorium, Grand Rapids, November 4-6.

Minnesota, Radisson Hotel, Minneapolis, May 9, 10.

Missouri, Municipal Auditorium, Kansas City, September 30, October 1, 2. Program Chairman, C. F. Warren, Marshall.

New England, Hotel Statler, Boston, April 25, 26. Program Chairman, Ernest A. Marcoux, Newton.

New Jersey, Hotel Sheraton, Newark, May 3, 4.

New York, Pennsylvania Hotel, New York City, October 3-5.

North Carolina, High Point, May 24.

Northwestern (Oregon, Washington, Idaho, and British Columbia), Seaside, Ore., June 16-18.

North Dakota, Wahpeton, May 17, 18.

Ohio, Deshler-Wallick Hotel, Columbus, May 11-13. Program Chairman, W. W. Custis, Dayton

Ontario, Royal Connaught Hotel, Hamilton, May 8-10. Program Chairman, Rosamond Pocock, Toronto.

Oregon: See Northwestern.

Osteopathic Academy of Orthopedists. Continental Hotel, Kansas City, February 26-28, 1948. Program Chairman, man, H. N. Tospon, St. Joseph, Mo.

Osteopathic College of Ophthalmology and Otorhinolaryngology, Statler Hotel, Detroit, July 17-19. Program Chairman, L. A. Lydic, Dayton, Ohio.

Osteopathic Cranial Association, Seminar, Hotel Stevens, Chicago, July 17.

Osteopathic Women's National Association, Chicago, July 20 and 22.

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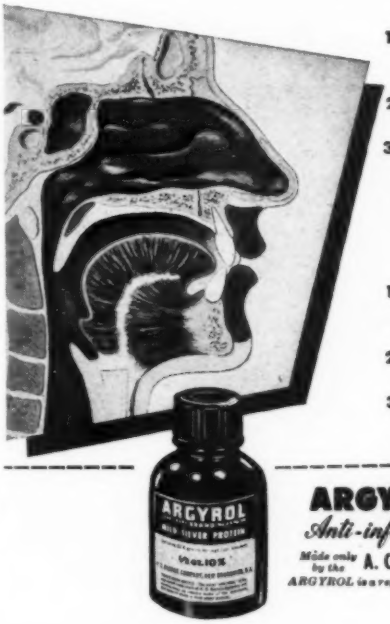

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Pennsylvania, William Penn Hotel, Pittsburgh, September 5, 6. Program Chairman, George D. Cline, Tarentum.

Society of Divisional Secretaries, Chicago, July 18, 19.

South Dakota, Marvin-Hughitt Hotel, Huron, May 25-27.

Utah, Hotel Eccles, Logan, June 13, 14.

Vermont, Rutland, September 24, 25. Program Chairman, R. H. Bartlett, Burlington.

Virginia, Richmond, May 3. Program Chairman, Alfred G. Churchill, Arlington.

Washington: See Northwestern.

West Virginia, West Virginia Hotel, Bluefield, June 1-3.

Wisconsin, Hotel Northern, Green Bay, May 1-3. Program Chairman, A. M. Kelchner, Sullivan.

OFFICIAL AND AFFILIATED ORGANIZATIONS

ARIZONA

Tucson

"Diagnosis of the Osteopathic Lesion" was the subject of the round-table discussion at the meeting in Tucson on February 5.

A meeting was scheduled to be held in Tombstone on March 2.

CALIFORNIA

Alameda County

At the January meeting in Berkeley the Nutritional and Deficiency Forum was presented.

The February meeting was scheduled to be held in Berkely.

Citrus Belt

Lee R. Borg, Los Angeles, presented a talk on ambulatory proctology at the meeting in Riverside on January 9.

Fresno County

At the meeting in Fresno on January 6 Wilbur A. Lose, Clovis, spoke on "Indications and Contraindications for Cesarean Section."

Glendale

Moving pictures on the treatment and prevention of eclampsia were scheduled to be presented at the meeting in Glendale on January 6.

Kern County

Robert P. Morhardt, Los Angeles, was the guest speaker at the meeting in Bakersfield on January 7. He conducted a discussion on the causes and prevention of death.

Los Angeles

"The Prolapsed Uterus" as the topic of the round-table discussion led by J. Gordon Hatfield, Los Angeles, at the February meeting.

"Eye Witness Account of the Bikini Atom Bomb Test" was scheduled for the program at the March meeting.

Monterey Peninsula

There has been a reclassification of the bureaus. The chairmen now are: Professional affairs, Donald Sheldon; public affairs, Clinton Zobel; public service, Charlotte Braginton; insurance, George Barden, all of Salinas.

Redwood Empire

A meeting was held in Santa Rosa on January 8.

A meeting was scheduled to be held on February 5 at San Rafael at which motion pictures on injection anesthesia were to be shown.

Sacramento Valley

Randall J. Chapman, Los Angeles, conducted the program, showing motion pictures of his own surgery, at the meeting in Sacramento on January 20.

San Gabriel Valley

At the meeting on January 16 at San Marino a motion picture on curare in the treatment of poliomyelitis was shown.

A meeting was scheduled to be held on February 20 at San Marino.

West Los Angeles

On January 14 in Los Angeles motion pictures on the treatment of anemias were shown.

DELAWARE

State Society

Frederick A. Long, Philadelphia, was the guest speaker at the meeting in Wilmington on January 14. He discussed the management of the mentally ill and the emotionally unstable.

FLORIDA

St. Petersburg

E. C. Andrews, Ottawa, Ill., was the guest speaker at the meeting in St. Petersburg on February 11.

The speaker scheduled for the meeting on February 18 was H. L. Samblanet, Canton, Ohio.

Sixth District

At the meeting in Lake Worth on January 17 the speaker was J. W. Norton, Ft. Lauderdale.

ILLINOIS

State Society

It has been announced in advance that the program at the annual meeting in Peoria May 2-4 will include the following: "Psychology in Professional Life," and "Horse Sense in Home Relations," George W. Crane, Ph.D., M.D., Chicago; "Common Neurological Diseases," H. D.

McClure, Kirksville, Mo.; "Antigen-Antibody Reactions and Their Clinical Applications," William J. Loos, Chicago; "Osteopathic Management of Common Symptoms," Byron Laycock; Paul E. Kimberley, and John M. Woods, all of Des Moines; "Undulant Fever," "Diagnosis of Rheumatoid Arthritis," and "Home and Office Management of Rheumatoid Arthritis," H. L. Samblanet, Canton, Ohio.

First District

A discussion on "Practice Problems" was conducted by members of the staff of the Chicago Osteopathic Hospital at the meeting in Chicago on March 6.

KANSAS

Topeka

At the meeting in Topeka on January 27 the following officers were elected: President, W. S. Briscoe; vice president, C. E. Brown; secretary-treasurer, Mary Zercher, all of Topeka.

The committee chairmen are: Membership, Dr. Zercher; ethics and professional education and development, D. A. Bragg; hospitals and industrial and institutional service, E. Claude Smith; clinics, C. E. Brown; statistics and convention program, Genevra Leader; convention arrangements and legislation, Roy Brown; public health and public relations, Joseph Stella, all of Topeka.

LOUISIANA

State Society

C. C. Rahm, Hammond, has been appointed to fill the unexpired term of William C. Conner as treasurer. Dr. Conner has moved to Illinois.

Southwest

A meeting was held at Crowley on February 8. Charles C. Rahm, Hammond, was appointed chairman of the Osteopathic Progress Fund committee for the State of Louisiana.

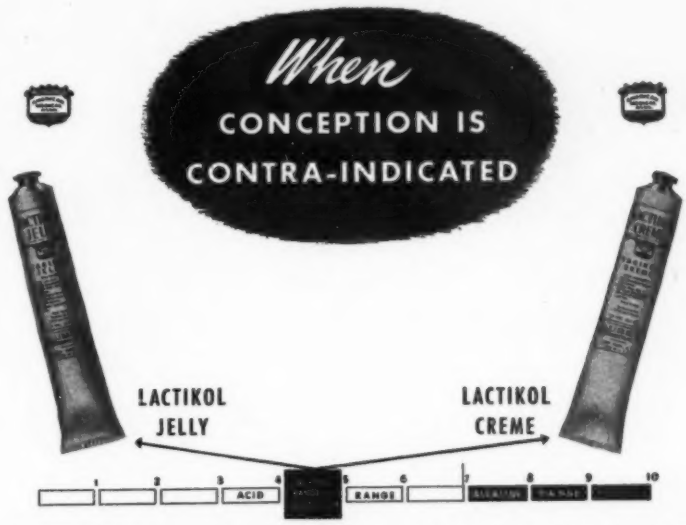
MASSACHUSETTS

State Society

The officers were announced in the March JOURNAL. The committee chairmen are: Legislative, Alden Q. Abbott, Waltham; ethics and censorship, Philip Taylor, Springfield; professional and public visual education, Wallace Muir, Boston; Massachusetts membership, Mrs. Gladys M. Stockdale, Newtonville; A.O.A. membership, I. Francis Butler, Worcester; speaker's panel, Nyles D. Crowner, Cambridge; convention, Charles W. Sauter, II, Gardner; program, Richard Montague, Concord; convention exhibits, Robert R. Brown, Belmont, and Everett L. Pierce, Newton; entertainment, Mildred E. Greene, Waltham; public clinics, Vincent M. Hammersten, Newton Highlands; student loan fund, Perrin T. Wilson, Cambridge; vocational guidance, Arthur A. Martin, Malden; editorial contacts, Dr. Brown; public relations and Federal-State coordination, Ernest A. Marcoux, Newton; P. & P. W., Charles W. Wood, Holyoke, veterans' affairs, J. Philip Gurka, Lawrence.

Connecticut Valley

A meeting was held in Northampton on February 18 at which Ward Bryant, Greenfield, continued his discussion and demonstration of cranial technic.



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Essex County

The officers are: President, Alan Snider; vice president, Arthur H. Bunting; treasurer, George Moore, all of Lynn; secretary, Andrew M. Longley, Newburyport; trustee, Morgan Carr, Swampscott. Dr. Carr is also program chairman.

Mystic Valley

"Thumbnail Diagnosis and Therapeutics" was the title of the talk given by Henry E. Leavitt, Stoneham, at the meeting in Medford on February 27.

Southeastern

Edward B. Sullivan, Boston, presented a discussion and demonstration on "Low-Back Problems" at the meeting in New Bedford on February 9.

MICHIGAN

Capitol

The officers were announced in the March JOURNAL. The committee chairmen are: Membership, Preston Wells; ethics, L. J. Green; hospitals and program, Hugh Beardslee; clinics, R. C. Shaft; statistics, G. F. Newark; convention program and arrangements, R. G. Gardner; legislation and public relations, Lawrence Jarrett; vocational guidance, F. C. Mutter; industrial and institutional service, H. G. Porter, all of Lansing; public health, C. H. Britton, East Lansing.

East Central

The program scheduled for the meeting in Flint on February 12 was as follows: "Preventive Medicine, the Doctor's Duty," Harry P. Stimson, Highland Park; "Professional Development and Welfare," John P. Wood, Birmingham; and "Public Health Problems," F. S. Leeder, M.D., Director, Bureau of Disease Control, Michigan Department of Health.

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*CoTui, A. L. Preiss, C. L. Burstein, and W. F. Ruggiero, "Animal Standards for Acute Toxicity of Spinal Anesthetic Agents," Journal of Pharmacology and Experimental Therapeutics, June 1942.
D. L. Burdick and E. A. Rovenstine, "Monocaine Formate: Its Application in Spinal Anesthesia," Anesthesiology, Sept. 1942.

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Oakland County

The officers were announced in the March JOURNAL. E. E. Ludwig, Rochester, has resigned as vice president and has been succeeded by M. E. Whitehead, Farmington. The trustees are L. A. Griswold, South Lyons, L. C. Johnson, Pontiac, and Ronald Emerick, Ferndale.

MINNESOTA

Minneapolis

The speaker at the February meeting was Lois Richardson, Austin. She presented case histories and discussed problems in the gynecological field.

MISSOURI

North Central

The vice president was incorrectly reported in the December JOURNAL. J. W. Aiken, Marceline, is first vice president and B. I. Axtell, Princeton, is second vice president.

West Central

At the meeting in Holden on January 20 the speakers were W. A. Rohlfing, Flat River, and Mr. Lawrence Jones, Jefferson City, executive secretary of the State Association.

NEW YORK

Western

The meeting scheduled to be held in Buffalo March 1 was to pay tribute to the men who have practiced 40 years or longer.

NORTH DAKOTA

State Society

Paul Kimberley, Des Moines, Iowa, is scheduled to be the guest speaker at the annual meeting in Wahpeton, May 17, 18.

OHIO

Second District (Sandusky)

L. D. Leidheiser, Huron, spoke on heart diseases and their treatment at the February meeting in Sandusky.

Eleventh District (Dayton)

A meeting was scheduled to be held in Dayton on February 26 at which Stephen Walker and Bernard Herbert, both of Dayton, were to speak on "Anesthesia from the Standpoint of the General Practitioner."

Twelfth (Springfield)

M. F. Hulett, Columbus, gave a brief history of osteopathy at the meeting in Springfield on January 8.

OKLAHOMA

Central

At the meeting in Seminole on January 21 the program consisted of a debate on "Socialized Medicine" between two Seminole high school teams.

OREGON

Southern

Blaine Pruitt, Grants Pass, read a paper on "Acquired Hypothyroidism" at the meeting in Grants Pass on January 13.

The February meeting was scheduled to be held in Medford.

PENNSYLVANIA

State Society

The program announced in advance for the refresher courses to be held in Pittsburgh March 4, 5 and in Philadelphia March 7, 8 were as follows: "Systemic Diseases As They Relate Themselves to the Rheumatic Syndrome," and "Clinical Manifestations of the Arthritides, Disease of the Central Nervous System and Endocrinopathies As Differentiated From the Rheumatic Syndrome," Ralph E. Everal, Detroit; "Roentgen Diagnosis of Rheumatoid Arthritis," and "The Roentgen Diagnosis of the Rheumatoid Spine and Conditions With Which It May Be Confused," Charles J. Karibo, Detroit; "Orthopedic Considerations of the Rheumatic Syndrome With Special Reference to the Extremities and the Spine," James M. Eaton, Philadelphia; and "Osteopathic Considerations of the Rheumatic Syndrome; Spinal and Appendicular Aspects," Walter P. Bruer, Detroit.

Lehigh Valley

At the meeting in Bethlehem on February 13 Mr. H. M. Engell of the Pennsylvania Manufacturers' Association Casualty Insurance Company spoke on workmen's compensation insurance.

District Five

Julian L. Mines, Philadelphia, spoke on caudal analgesia in obstetrics at the meeting in Harrisburg on February 2.

The March meeting was scheduled to be held in Lancaster.

TEXAS

Dallas

The January meeting was scheduled to be held at Dallas. John W. Drew, Dallas, was to speak on "Intestinal Parasites."

The regular meeting on February 13 was an appreciation dinner for Robert E. Morgan, State association president. R. H. Peterson, Wichita Falls, was the guest speaker.

Panhandle

At the meeting in Amarillo on February 16 the guest speaker, Ray E. McFarland, Wichita, Kans., spoke on "Endocrinology." W. H. Ballow, Amarillo, spoke on low-back pain and demonstrated therapeutic technic and W. M. Jackson, Amarillo, talked on

useful laboratory procedures for the general practitioner.

A meeting is scheduled to be held on June 1.

VERMONT

Clinical Group

A meeting was held in Bennington on February 16. Legislative matters were discussed and problem cases were reported.

A meeting is scheduled to be held on April 20.

WISCONSIN

State Society

Mary Golden, Des Moines, Iowa, and W. Don Craske, Chicago, are scheduled to appear on the program of the annual meeting at Green Bay, May 1-3.

Fox River Valley

A meeting was scheduled to be held at Oshkosh on March 13.

Madison District

"Legal Interpretation of Practice" was presented by Attorney J. Jeffson and "Recent Advances in Clinical Physiology" by H. Ward Ferril, Ph.D., of the faculty of Chicago College of Osteopathy at the meeting in Janesville on February 20.

Milwaukee District

A meeting was held in Milwaukee on February 13.

A meeting was scheduled to be held in Wauwatosa on March 6 at which "Case Reports and Discussions" was to be presented through the courtesy of the Chicago College of Osteopathy and the Chicago Osteopathic Hospital.

CANADA

BRITISH COLUMBIA

The officers are: President, M. P. Thorpe, Vancouver; vice president, V. B. Taylor, Victoria; secretary-treasurer, W. C. Atkinson, Vancouver.

ONTARIO

The following program has been announced for the forty-sixth annual meeting to be held in Hamilton May 8-10: "Chapman's Reflexes," and "Management of Postoperative Disk Retropulsion," C. Haddon Soden, Philadelphia; "The Search for Zero," and "Factor Affecting Autonomic Balance," Alan Becker, Jackson, Mich.; "Personality Problems and Their Effect on Health," "The Psychoneuroses," and "Psychotherapeutics," Edwin F. Peters, Ph.D., President of the Des Moines Still College of Osteopathy; "Vegetative Nervous System," "Low-Back Problems," "Treatment of Acute Infections," and "Osteopathy and Arthritis," Byron Laycock, Des Moines, Iowa.

SPECIAL AND SPECIALTY GROUPS

CALIFORNIA ASSOCIATION OF OSTEOPATHIC INDUSTRIAL SURGEONS

At the January meeting Donald Baker, Los Angeles, talked on peripheral vascular diseases.

The hospitalization of industrial cases was the topic announced to be discussed by Howard Norcross, Los Angeles, at the meeting on February 20.

LOS ANGELES PROCTOLOGIC STUDY GROUP

W. T. Sechrist, Los Angeles, spoke on the causes and results of constipation at the January meeting.

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or
NEPHROPTOSIS
with Symptoms

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LOW BACK PAIN
ANTEPARTUM-
POSTPARTUM
POSTOPERATIVE

BREAST CONDITIONS

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OSTEOPATHIC ACADEMY OF ORTHOPEDISTS

The following officers were elected at the meeting in Detroit February 20-22: President, C. Robert Starks, Denver; vice president, Leonard C. Nagel, Kansas City, Mo.; secretary-treasurer, J. Paul Leonard, Detroit (re-elected). The trustees are W. E. Darling, Detroit, H. N. Tospon, St. Joseph, Mo., W. D. Bradford, Dayton, Ohio, H. E. Clybourne, Columbus, Ohio, J. W. Mulford, Cincinnati, H. F. Schaffer, Detroit, and John P. Wood, Birmingham, Mich.

OSTEOPATHIC CRANIAL ASSOCIATION

Announcement has been made of the formation of the Osteopathic Cranial Association, an affiliate of the Academy of Applied Osteopathy. The stated purposes of the organization are: "1. To establish a foundation for the growth of Cranial Osteopathy as conceived and developed by Dr. W. G. Sutherland. 2. To disseminate a general knowledge of the philosophy of, and the therapeutic indications for Cranial Osteopathy. 3. To encourage Osteopathic Physicians to become adequately trained in the principles and practice of Cranial Osteopathy through training sources approved by this association. 4. To stimulate continued study and greater proficiency on the part of those practicing Cranial Osteopathy."

The officers are: Honorary President, W. G. Sutherland, St. Peter, Minn., President, Paul E. Kimberley, Des Moines, Iowa; vice president, Raleigh S. McVicker, The Dalles, Ore. The members of the Executive Board are: Glenn

This

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The committee chairmen are: 1947 Convention facilities, Beryl Freeman, Des Moines, Iowa; convention program, Richard B. Gordon, Madison, Wis.; study group, W. A. Newland, Seattle; education, Rebecca Lippincott; publications, Howard Lippincott, both of Moorestown, N. J.; professional development, Dr. Gnau; pediatrics development, Beryl Arbuckle, Philadelphia. Chester Handy, Providence, R. I., is historian.

OSTEOPATHIC SURGICAL SOCIETY OF LOS ANGELES

Howard Lamb, Denver, was the guest speaker at the February meeting in Los Angeles. He spoke on "Vaginal Hysterectomy by the Clamp Method."

PACIFIC COAST PROCTOLOGICAL CONVENTION

A meeting was held in Phoenix February 17, 18. Among those who presented papers were M. M. Vick, Loveland, Colo., Samuel A. Reese, Long Beach, Calif., S. W. Meyer, Hot Springs, N. Mex., Richard W. Hurst, Denver, and Lester J. Vick, Amarillo, Tex.

PUGET SOUND ACADEMY OF APPLIED OSTEOPATHY

Included in the program announced in advance for the meeting to be held in Seattle on March 19 were the following: "Sutures of the Temporal Bone," Panel Session led by Margaret Gregory, Tacoma; "Osteopathic Management of the Heart," A. B. Cunningham, Seattle; and "Varicose Veins," E. E. LaCroix, Seattle.

State and National Boards

ARIZONA

Basic science examinations June 17 at University of Arizona, Tucson. Applications must be filed 2 weeks prior to examination. Address Francis A. Roy, secretary, Basic Science Board, University of Arizona, Tucson.

COLORADO

Basic science examinations in June. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 3.

CONNECTICUT

Basic science examinations June 14 at New Haven. Applications must be filed 2 weeks before examination. Address M. G. Reynolds, Executive Assistant, State Board of Healing Arts, 250 Church St., New Haven 10.

FLORIDA

Basic science examinations May 31. Applications must be filed by May 16. Address M. W. Emmel, D.V.M., secretary, Board of Examiners in the Basic Sciences, University of Florida, Gainesville.

Professional examinations June 21, 22 at St. Petersburg. Address Richard S. Berry, D.O., secretary, Board of Osteopathic Medical Examiners, P.O. Box 124, Station "A," St. Petersburg.

IDAHO

Examinations June 12. Address Miss Agnes Barnhart, Director, Bureau of Occupational License, Dept. of Law Enforcement, Boise.

ILLINOIS

Examinations June 24-26. Address the osteopathic examiner, Oliver Foreman, D.O., 58 E. Washington St., Chicago.

INDIANA

Examinations at Indianapolis, June 17-19. Address Paul R. Tindall, M.D., secretary, Board of Medical Examination and Registration, 20 N. Pike St., Shelbyville.

MAINE

Examinations June 10, 11. Address Albert E. Chittenden, D.O., secretary, Board of Osteopathic Examination and Registration, 50 Goff St., Auburn.

MARYLAND

Examinations in June. Address W. H. Waugaman, D.O., secretary, Board of Osteopathic Examiners, 33 S. Centre St., Cumberland.

MICHIGAN

Basic science examinations May 9, 10 at Ann Arbor and Detroit. Applications must be filed by May 1. Address Miss Eloise LeBeau, secretary, Board of Examiners in the Basic Sciences, 101 N. Walnut St., Lansing.

MINNESOTA

Basic science examinations June 3, 4 at Millard Hall, University of Minnesota, Minneapolis. Address Raymond Bieter, M.D., secretary, Board of Examiners in the Basic Sciences, 126 Millard Hall, University of Minnesota, Minneapolis 14.

MISSISSIPPI

Examinations in June. Address R. N. Whitfield, M.D., assistant secretary, Board of Health, Jackson 113.

NEBRASKA

Basic science examinations May 6, 7. Applications must be filed 15 days prior to examination. Address John S. Latta, Ph.D., secretary, Basic Science Board of

Examiners, University of Nebraska College of Medicine, Omaha.

NEW JERSEY

Examinations June 17, 18. Address E. S. Hallinger, M.D., secretary, Board of Medical Examiners, 28 W. State St., Trenton.

NEW MEXICO

Basic science examinations May 4. Address Mrs. Marian Rhea, Assistant Secretary of State, c/o Secretary of State's office, Santa Fe.

NEW YORK

Examinations June 23-26. Address Mr. Harry L. Field, Chief, Bureau of Qualifying Certificates and Professional Examinations, Albany.

OHIO

Examinations June 17-20 at Columbus. Address H. M. Platter, M.D., secretary, State Medical Board, Wyandotte Bldg., Columbus.

ONTARIO

Examinations in June. Address Mrs. Mary E. Richardson, secretary pro tem., Board of Regents, Drugless Practitioners Act, 57 Bloor St., W., Toronto.

OREGON

Basic science examinations June 7. Address Mr. Charles D. Byrne, secretary, State Board of Higher Education, Eugene.

RHODE ISLAND

Basic science examinations May 14. Applications must be filed by May 1. Address Mr. Thomas B. Casey, Administrator of Professional Regulation, 366 State Office Bldg., Providence.

SOUTH CAROLINA

Examinations June 17, 18. Address M. V. Huggins, D. O., secretary, Board of Osteopathic Examiners, 208 Carolina Life Bldg., Columbia 56.

SOUTH DAKOTA

Examinations in June. Address Gregg M. Evans, Ph.D., secretary, Basic Science Board, Yankton College, Yankton.

TEXAS

Examinations in June. Address T. J. Crowe, M.D., secretary, Board of Medical Examiners, 918 Texas Bank Bldg., Dallas.

VERMONT

Charles D. Beale, Rutland, has been appointed to the Board of Osteopathic Examiners for a term of 3 years. He succeeds R. L. Martin, Montpelier.

VIRGINIA

Examinations June 18-21. Part I may be taken after second year of professional training. Parts I and II may not be taken at the same time. Address J. W. Preston, M.D., secretary, Board of Medical Examiners, 30½ Franklin Rd., S. W., Roanoke.

WISCONSIN

Examinations June 24-26. Address C. A. Dawson, M.D., secretary, Board of Medical Examiners, River Falls.

WYOMING

Examinations June 2, 3 at State Capitol, Cheyenne. Address G. M. Anderson, M.D., secretary, Board of Medical Examiners, State Capitol, Cheyenne.

Clinton E. Van Vleck has been appointed osteopathic member of the Board to succeed E. Ben Sturges, Rawlins. The term will expire May 20, 1949.

RE-REGISTRATION OF OSTEOPATHIC LICENSES

April 15—Montana, $2.00 for residents; $1.00 for nonresidents. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

May 1—Iowa, $1.00. Address Mr. Dwight S. James, ass't secretary, Board of Osteopathic Examiners, 914 Walnut Bldg., Des Moines 9.

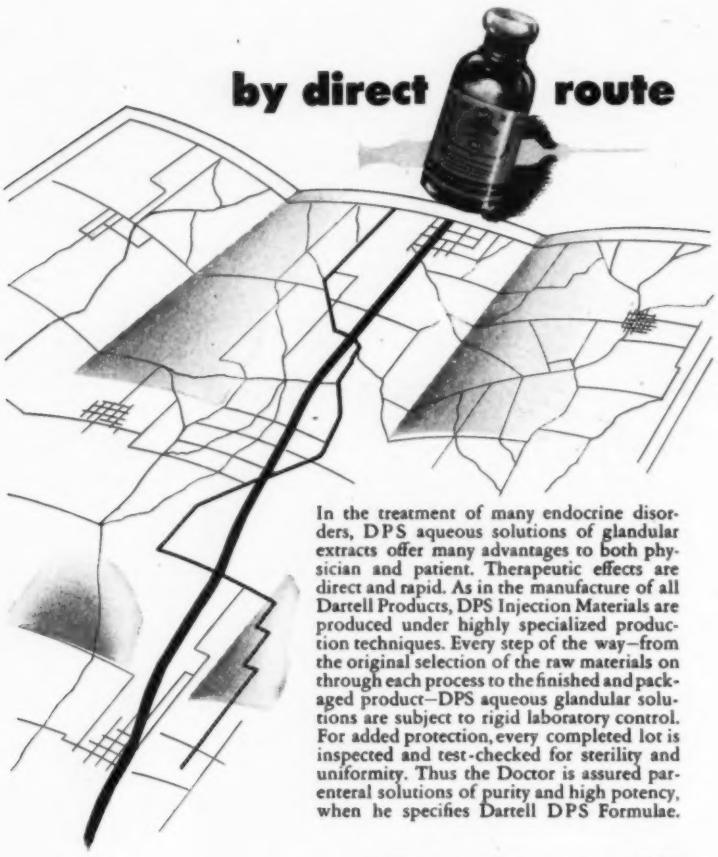
May 1—Washington, $2.00. Address Mr. Harry C. Huse, director, State Department of Licenses, Olympia.

EXAMINATIONS BY NATIONAL BOARD

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary, and the completed application blank, together with a passport photograph and check for the part or parts to be taken, must be in the Secretary's office by the November 15, or April 15, preceding examination. Part III of the examination will be given in specified locations at the discretion of the Board and for the convenience of the applicant.

Examinations in Part I consist of anatomy, physiology, pathology, chemistry, and bacteriology. Part II consists of examination in mental diseases, surgery, obstetrics and gynecology, pediatrics, public health, osteopathic theory and practice. Part III is an oral examination.

Address John E. Rogers, D.O., Secretary, 16 Mount Vernon Street, Oshkosh, Wisconsin.



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HOSPITAL SURVEY AND CONSTRUCTION ACT REGULATIONS

(Continued from ad page 55, March issue)

Obstetrics Department

Facilities in each nursing unit:
- Doctors' office with toilet (for each two units).
- Examination room.
- Nurses' station.
- Utility room.
- Patients' locker room.
- Patients' toilet room.
- Patients' wash room.
- Patients' shower and dressing room.
- Day room (40 to 50 square feet per patient). Preferably divided into (1) small room and (1) large room.
- Storage closet (recreational equipment).
- Occupational therapy room (one for each two units).
- Linen closet.
- Janitors' closet.

Dietary:
- Dining room—cafeteria service.
- Serving kitchen.
- Dishwashing room.
- Employees' toilet.
- Janitors' closet.

Infirm. This area will house patients who are in need of considerable medical care and who may be infirm. The very sick will be transferred to the medical and surgical building, but these patients will need constant and careful nursing. Minimum security and all safety measures will be required, and the nursing units should be complete with all facilities available and readily accessible to an out-door yard or area.

Location: Close to medical and surgical building.

General:
- Entrance lobby.
- Visitors' room.
- Visitors' toilets (male and female).
- Barber shop (male buildings).[1]
- Beauty shop (female buildings).[1]
- Attendants' locker and toilet room (male and female).
- Mechanical room.
- Enclosed yard (40 square feet per patient).[1]

Nursing units (to contain 30 to 60 beds) suggested bed distribution for each unit:

	Patients
Two 10-bed wards	20
Four 4-bed wards	16
Four 1-bed rooms	4
Total	40

Facilities in each nursing unit:
- Doctors' office (for each 3 units).
- Examination room.
- Nurses' station.
- Utility room.
- Bed pan facilities.
- Pantry and dining room (one for each two units).
- Patients' locker room.
- Patients' wash room.
- Patients' toilet room.
- Patients' dressing room.
- Patients' shower or bath room.
- Day room (30 square feet per patient).
- Storage closet (for recreational and occupational therapy equipment).
- Linen closet.
- Wheel chair and stretcher closet.
- Janitors' closet.

Dietary:
- Serving kitchen.
- Dishwashing room.
- Employees' toilet.
- Janitors' closet.

Inactive. This area will house patients who are lethargic. They need a considerable amount of attention, most of which will be furnished by the physical therapist and occupational therapist. They will be urged into activities furnished in the occupational and recreational therapy buildings, but some of the lighter occupational and physical therapy should be provided in this area. All security and safety measures will be required.

Location: In main group of nursing buildings and near gymnasium and recreation buildings.

General:
- Entrance lobby.
- Visitors' room.
- Visitors' toilets (male and female).
- Occupational therapy room (one to each two nursing units).
- Attendants' locker and toilet room.
- Mechanical room.
- Enclosed yard (100 square feet per patient).[1]

Nursing units (to contain 30 to 50 beds) suggested bed distribution (of each unit):

	Patients
Three 10-bed wards	30
Two 4-bed wards	8
Four 1-bed rooms	4
Total	42

Facilities in each nursing unit:
- Doctors' office (for each 3 units).
- Examination room.
- Nurses' station.
- Utility room.
- Bedpan facilities.
- Pantry (for each 2 units).
- Patients' locker room.
- Patients' wash room.
- Patients' toilet room.
- Patients' shower or bath room.
- Patients' dressing room.
- Day room (40 to 50 square feet per patient and preferably divided into one small and one large room).
- Storage closet (for recreational and occupational therapy equipment).
- Linen closet.
- Janitors' closet.

Dietary:
- Dining room.
- Serving kitchen.
- Dishwashing room.
- Employees' toilet.
- Janitors' closet.

Industrial. This area will house patients who are well enough to be occupied on the grounds, farm, industrial buildings, shops, kitchens, laundry, etc. Less supervision and

[1] Desirable but not mandatory.

care is necessary than in the other groups, and these patients can go to the out-patient department of the medical and surgical building for examination and treatment.

Location: In main group of nursing buildings near service buildings.

General:
- Entrance lobby.
- Visitors' room.
- Visitors' toilets (male and female).
- Attendants' locker and toilet room.
- Mechanical room.

Nursing units (to contain 40 to 60 beds) suggested bed distribution:

	Patients
Two 16-bed wards	32
Two 8-bed wards	16
Four 1-bed rooms	4
Total	52

Facilities in each nursing unit:
- Doctors' office and examination room—one for each 3 units.
- Nurses' station.
- Patients' toilet.
- Patients' dressing room.
- Patients' shower room.
- Patients' locker room.
- Patients' wash room.
- Day room (40 to 50 square feet per patient) preferably divided into one small and one large room.
- Storage closet (for recreation equipment).
- Linen closet.
- Janitors' closet.

Medical and surgical. This area will house patients who have been hospitalized from Nursing Units of other classifications for short periods of illnesses, and should be housed in a modern general hospital complete with all facilities to serve the entire mental hospital community. Nursing Units should be arranged for easy segregation of patients and the Adjunct Diagnostic and Treatment facilities are recommended to be on the first or ground floor for easy access to the out-patient department. All security and safety measures should be incorporated in this building. The number of beds shall be approximately 4 per cent of the total patients which this building serves.

Location: Between main group of nursing area and reception area.

General:
- Entrance lobby.
- Information counter.
- Visitors' toilets (male and female).
- Mechanical room.

Administration:
- Chief physician's office.
- Medical record room.
- Head nurse's office.
- Secretaries' offices.
- Personnel toilets (male and female).

Staff facilities:
- Doctors' locker and shower rooms.
- Nurses' locker and shower room.

Adjunct diagnostic and treatment facilities:
- Laboratory: Separate spaces for office, clinical, pathology, bacteriology and serology, washing, and sterilizing.
- Basal metabolism and electrocardiography: Near laboratory and convenient to out-patient department.
- Morgue and autopsy room:[1] Combination morgue and autopsy with mortuary refrigerator.

Radiology:
- Radiographic room with an adjoining dark room and office.
- X-ray therapy suite.[1]
- Physical therapy: Suite for electro-therapy, stimulative hydro-therapy, and exercise room with adjoining office.
- Pharmacy: Drug room with minimum facilities for mixing. (May be in service area).

Nursing units (to contain from 15 to 30 beds) suggested bed distribution:

Medical wards (25 beds each):

	Patients
Two 4-bed wards	8
Three 2-bed rooms	6
Nine 1-bed rooms	9
Isolation suite[1]	2
Total	25

Surgical wards (25 beds each) same as medical wards.

In Ringworm of the Scalp, examination under ordinary light shows only the patches (left), while under Wood's light the patches and *all isolated hairs* glow with green fluorescent color (right). Thus, complete diagnosis is possible. If the lesion does not fluoresce it is not Ringworm (see "Report of the Present Epidemic"—J. A. M. A.—February 1, 1947).

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Employees' wards:[1] Maximum size, 25 to 30 beds.

NOTE: Where isolation suite or contagious disease nursing unit is available the small units in each nursing unit are not required.

Facilities in each nursing unit:
- Doctors' examination room (one for each two nursing units).
- Nurses' station.
- Utility room.
- Bed pan facilities.
- Pantry (one for each two nursing units).
- Patients' bath and shower room.
- Supply closet.
- Patients' toilet room (male and female).
- Day room (approximately 25 square feet per patient). Omit for employees' wards.
- Storage closet (recreational and occupational therapy equipment).
- Stretcher and wheel chair closet.
- Linen closet.
- Janitors' closet.

Surgical department: Should be located to prevent traffic through it to any other part of hospital.

Operating rooms:
- Major: One for each 50 beds up to and including 200 beds. Above 200 beds the number of operating rooms will be based on the expected average of daily operations.
- Minor: One in each hospital over 50 beds.
- Cystoscopy:[1] One in each hospital over 100 beds. Should have an adjoining toilet room.
- Fracture room: One in each hospital over 100 beds. Shall have an adjoining splint room.

Auxiliary rooms:
- Substerilizing room: One between each two operating rooms in hospitals of 50 beds and over.
- Scrub-up room: One between each two operating rooms.
- Nurses' locker room with toilet and shower.
- Instrument room beginning at 100 beds.
- Clean-up room.

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Anesthesia equipment storage.
Surgical supervisor station.
Doctors' locker room with toilet and shower.
Storage closet.
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Storage room for sterile supplies beginning at 100 beds.
Janitors' closet.
Dark room beginning at 100 beds.

Central sterilizing and supply room:
Divided into work space, sterilizing space and sterile storage space.
Adjacent room for storage of unsterile supplies.

Emergency department:
Ambulance entrance.
Receiving bath and toilet.
Utility room.
Supply and stretcher storage.
Emergency operating room, near out-patient department.

Service department:
Kitchen (serving).
Dishwashing room.
Refrigerated garbage room.
Can washing room.
Dining rooms (for ⅓ of patients).
Storage.
General storage (20 square feet per bed).
Housekeepers' office.
Linen storage room.
Sewing room.
Linen sorting room.
Personnel facilities.
Locker and toilet room (male and female).
Attendants' locker and toilet room (male and female).

Out-patient department:
Waiting room.
Examination and treatment room (including eye, ear, nose and throat rooms and gynecology room).[1]
Record room.
Dental suite (2 chairs).
Electroencephalographic unit.

NOTE: Out-patient department should be convenient to radiology, laboratory, therapy, emergency, etc.

Chronic disease. This area will house patients who have chronic illness, or who are in need of intensive treatment and nursing care or those who, because of infectious diseases, need to be isolated.

Nursing Units of this classification should be attached to the Medical and Surgical building for easy access to the Diagnostic and Treatment facilities.

Not all of these Nursing Units need have maximum safety and security measures.

The number of beds shall be approximately 2 per cent of the total number of patients which these buildings serve.

Location: Attached to medical and surgical building.

General: Corridors to service department and adjunct facilities.

Nursing units (to contain from 15 to 30 beds) suggested bed distribution (of each nursing unit):

	Patients
Two 4-bed wards	8
Three 2-bed wards	6
Eight 1-bed rooms	8
Total	22

Facilities in each nursing unit:
Doctors' office (for each 2 units).
Examination room.
Nurses' station.
Utility room.
Bed pan facilities.
Pantry (for each 2 nursing units)
Dining room (for ½ of patients in nursing unit).
Patients' locker room.
Patients' wash room.
Patients' toilet.
Patients' dressing room.
Patients' shower or bath room.
Day room (30 square feet per patient).
Closet (recreational and occupational therapy equipment).
Stretcher and wheel chair closet.
Linen closet.
Janitors' closet.

Tuberculosis. For patients of this classification, it is recommended to use the requirements of the tuberculosis hospital. In addition, patients will be grouped according to behavior as Quiet or Disturbed. Security and safety measures comparable to those of the Reception Area are required.

The number of beds shall be determined as approximately 5 per cent of the total patients which this building serves.

Gymnasium, Theater, Recreation, Library and Chapel

(Combination or separate buildings acceptable)
Location: Adjacent to main group of nursing and reception areas.

General:
Entrance lobby.
Coat rooms and toilets (male and female).
Personnel toilets (male and female).
Mechanical room.

Theater facilities:
Office.
Hall (seating capacity based on 7 square feet per person with 40 per cent attendance of patients and personnel).
Projection booth.
Stage.
Dressing rooms with toilets (two for each sex).
Work shop.

Chapel facilities:
Three offices for ecclesiastics.
Toilets.
Three small prayer rooms.
Portable altars (where chapel is not separate).
Storage rooms.

Gymnasium facilities:
Recreational therapists' office.
Personnel locker and toilet room (male and female).
Patients' locker and toilet rooms (male and female).
Basketball court (standard college size plus space for collapsible seating).
Small gymnasium (for exercise equipment).
Storage rooms.

[1] Desirable but not mandatory.

Recreation facilities:
- Chief recreational therapist's office.
- Bowling alleys (with space for spectators).
- Billiard room.
- Ping pong room.
- Patients' barber shop.
- Patients' beauty shop.
- Canteen (for light lunch, drinks, etc.).
- Office and table areas.
- Cooking and fountain areas.
- Dishwashing and sterilizing.
- Storage.
- Garbage refrigeration.
- Can washing.
- Sales rooms.
- Storage room.

Library:
- Librarians' office.
- Reading room (current and request matter).
- Stock room.
- Work room and storage space.

Music rooms:
- Music therapists' office.
- Music room (approximately 500 square feet with portable stage).
- Store rooms.
- Music rooms (approximately 250 square feet).

Occupational Therapy

Location: Adjacent to main group of nursing areas and reception area.

General:
- Entrance lobby.
- Patient coat room and toilets (male and female).
- Personnel coat room and toilets (male and female).
- Mechanical room.

Administration: Office for occupational therapist.

Facilities:
- Open floor space (for occupaitonal equipment).
- One or more special purpose rooms.
- Storage rooms (for materials and equipment).
- Industrial therapy occupations should be located near the service group of buildings.

Central Kitchen and Dining Rooms

Location: In the main group of Nursing buildings.

General: load on dining rooms, kitchens and preparation will vary; see requirements of each.
- Men patients' coat room and toilet.[1]
- Women patients' coat room and toilet.[1]
- Men attendants' coat room and toilet.
- Women attendants' coat room and toilet.
- Dining rooms: patients' and personnel (capacity 15 square feet per person).

Kitchen:
- Dietitians' office and toilet.
- Diet kitchen.
- Complete cooking and baking facilities.
- Dishwashing room.
- Preparation (meat and vegetables).
- Refrigerated storage.
- Day storage.
- Garbage refrigeration and can washing room.
- Janitors' closet.
- Personnel lockers and toilets.

Storage Buildings

Location: In service groups of buildings.

General: Area (20 square feet per patient).

Laundry

Adequate to process seven full days of laundry per work week.

Location: In service group of buildings.

Facilities:
- Manager's office and toilet.
- Receiving room.
- Sorting area.
- Contaminated receiving room.
- Sterilizing room.
- Clean linen storage.
- Sewing room.
- Personnel locker and toilet room.

Heating Plant

Location: In service group of buildings.

General:
- Heating plant (to be determined by engineering studies).
- Emergency generating facility.
- Office.
- Personnel toilets.
- General repair shop.
- Carpenter shop.
- Electrical shop.
- Plumbing shop
- Paint shop.

TONGALINE is supplied in both liquid and tablet form. Clinical samples upon request.

Salicylate Therapy in ARTHRITIS ...AUGMENTED

The standard salicylate therapy in the rheumatic syndrome is superseded by TONGALINE. The sodium salicylate is *augmented* with belladonna, cimicifuga, pilocarpine, and tonga -- proportioned to provide maximum therapeutic efficacy. The co-ordinated pharmacodynamics of these ingredients alleviates joint pain, relaxes muscle spasm, dilates blood vessels, and encourages diuresis and diaphoresis.

MELLIER DRUG CO., ST. LOUIS 1, MO.

Tongaline
Trade Mark

Incinerator

Location: Removed from building areas.

General: For trash, kitchen refuse, etc. (size to be determined by engineering study).

(B-4). *Psychiatric hospital—General.* The principles of psychiatric safety shall be followed throughout. Materials and details of construction shall be such that patients will not be afforded opportunity for escape, suicide, etc. Care must be taken to avoid sharp projections of corners of structure, exposed piping, heating elements, fixtures, hardware, etc.

For requirements of sizes of doors, widths of corridors, sizes of elevators, provisions for ventilation, fire protection, etc., see section on Details, Finishes, etc.

Administration Department

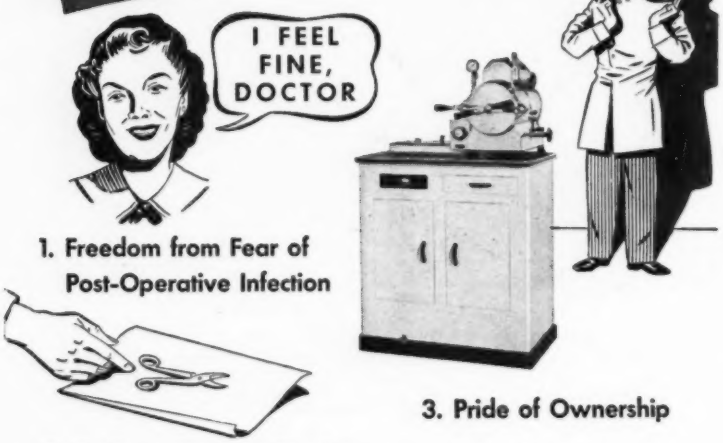
Up to and including 100 beds:
- Business office with information counter.
- Chief psychiatrist's office.
- Chief psychologist's office (if there is no out-patient department).
- Record office.
- Director of nurses' office.[1]
- Social service offices (if there is no out-patient department to be near receiving).
- Staff lounge.
- Lobby.
- Public toilets.

From 100 to 500 beds:
- Business office.
- Chief psychiatrist's office.
- Chief psychologist's office (if there is no out-patient department).
- Social service offices (if there is no out-patient department).
- Director of nursing.
- Record room.
- Staff lounge.
- Library and conference room.
- Lobby.
- Public toilets.
- Toilets for administrative personnel.

Receiving Department

Facilities for male and female receiving:
- Entrance hall.
- Dressing room.
- Bath and toilet room.
- Medical examination room.
- Waiting room.
- Stretcher closet.
- Clerks' offices.
- Doctors' office.

You Get All Three with PELTON HP



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Adjunct Diagnostic and Treatment Facilities

Laboratory:
- Up to and including 100 beds:
  - Office.
  - Laboratory.
- Over 100 beds: Separate spaces for office, clinical pathology, bacteriology, washing and sterilizing.

Basal metabolism and electrocardiography:
- Up to and including 100 beds: No special provision necessary.
- Over 100 beds: Room near laboratory and convenient to out-patient department.

Morgue and autopsy: Combination morgue and autopsy with mortuary refrigerator. (Is not required in hospital of less than 100 beds if similar facilities are available nearby).

Two chair dental suite.

Eye, ear, nose and throat suite.

Electro-encephalographic suite.

Radiology:
- Up to and including 100 beds: One radiographic room and dark room and convenient to out-patient department.
- Over 100 beds: At least one additional radiographic room.

Physical therapy:
- Electro-therapy.
- Hydro-therapy with exercise space.
- Continuous tub and pack room.
- Small gymnasium, convenient to outdoor area, and to disturbed patients.

Pharmacy: One room with minimum facilities for compounding.

Occupational therapy:
- Space for small woodworking tools and benches for carpentry, metal work, leatherwork, printing, weaving, rug making, etc. Office.
- Storage room.

Surgical Department

Operating rooms.
- Major: One.
- Minor: One, with adjoining splint room.

Auxiliary rooms:
- Sub-sterilizing room (one between two operating rooms).
- Scrub-up room (one between two operating rooms).
- Clean-up rooms.
- Anesthesia room.[1]
- Anesthesia storage.
- Doctors' locker room with toilet.
- Nurses' locker room with toilet.
- Storage closet.
- Stretcher closet.
- Janitors' closet.
- Storage room for sterile supplies and instruments.
- Surgical department to be located to prevent traffic through it from other parts of the hospital.
- Central sterilizing and supply room—divided into work space, sterilizing space, and sterile storage—adjacent room for storage of unsterile supplies.

Nursing Department

General: The layout and design of details to be such that the patient will be under close observation and will not be afforded opportunity for escape, suicide, hiding, etc. Provision shall be made for the following classifications:
- New admissions (male).
- New admissions (female).
- Quiet ambulant (male).
- Quiet ambulant (female).
- Medical and Surgical.
- Disturbed (male).
- Disturbed (female).
- Alcoholic (male).
- Alcoholic (female).
- Criminalistic (male).
- Criminalistic (female).
- Children.

Minimum room areas:
- 80 square feet per bed in four-bed rooms.
- 125 square feet in single rooms.
- 40 to 50 square feet per patient in day rooms and preferably divided into one large and one small room.

Facilities for each nursing unit:
- Doctors' office and examination room.
- Nurses' station and toilet.
- Day rooms.
- Utility room.
- Pantry.
- Dining room.
- Wash room and toilets.
- Patients' locker.
- Shower and bath room.
- Storage closet (for recreational and occupational therapy).
- Supply closet.
- Linen closet.
- Janitors' closet.
- Stretcher closet.[2]
- Bed pan facilities.[2]

Isolation suite: In medical and surgical unit.

Service Department

Dietary facilities:
- Main kitchen and bakery.
- Special diet kitchen.
- Dietitians' office.
- Dishwashing room.
- Adequate refrigerators.
- Garbage refrigerator.
- Can washing room.
- Day storage room.
- Staff dining room (12 square feet per person).

Housekeeping facilities:
- Laundry (if provided): Capacity shall be adequate to process full 7 days laundry in work week.
- Sorting area.
- Processing room.
- Clean linen and sewing room separate from laundry.

Housekeeper's office: Near linen storage.

Mechanical facilities:
- Boiler room and pump room (if provided).
- Engineers' office.
- Shower and locker room.
- Maintenance shops—carpentry, painting, mechanical repair rooms.

Employees' facilities:
- Nurses' locker rooms. If no nurses home:
  - Locker room.
  - Rest room.
  - Toilet and shower room.
- Attendants' locker rooms. If no attendants home (male and female):
  - Locker room.
  - Toilet and shower rooms.

[1] Desirable but not mandatory.
[2] Medical and surgical unit.

Other female help lockers:
Locker room.
Rest room.
Toilet and shower room.

Other male help lockers:
Locker room.
Toilet and shower room.

Storage:
Record space.
General storage: 20 square feet per bed and to be concentrated in one area.

Out-Patient Department (if provided)

General:
Located on the ground floor with entrance separate from main entrance of hospital. It must be convenient to radiology, laboratory and physical therapy.

The patient load must be estimated in order to determine the number of consultation and examination rooms.

Facilities required:
Administrative:
Waiting room with public toilets.
Cashiers' and appointment office.
Social service offices.
Psychological examination rooms.
Medical examination rooms.
Utility rooms.
Children's rooms.

(B-5). *Chronic Disease Hospital—Intensive Nursing Section.*

Administration (for infirmary and home):
Business office with information counter, telephone switchboard and cashiers' window.
Administrator's office.
Medical director's office.
Medical record room.
Medical social service office.
Combination conference room and doctors' lounge.
Lobby and waiting room.
Public toilets.
Personnel toilets.

Adjunct Diagnostic and Treatment Facilities

Laboratory:
Two rooms for analyses.
Sterilizing and glasswashing room.
Pathologist's office.

Basal metabolism and electrocardiography: One room convenient to Out-Patient Department and laboratory.

Morgue and autopsy: Combination morgue and autopsy with mortuary refrigerator.

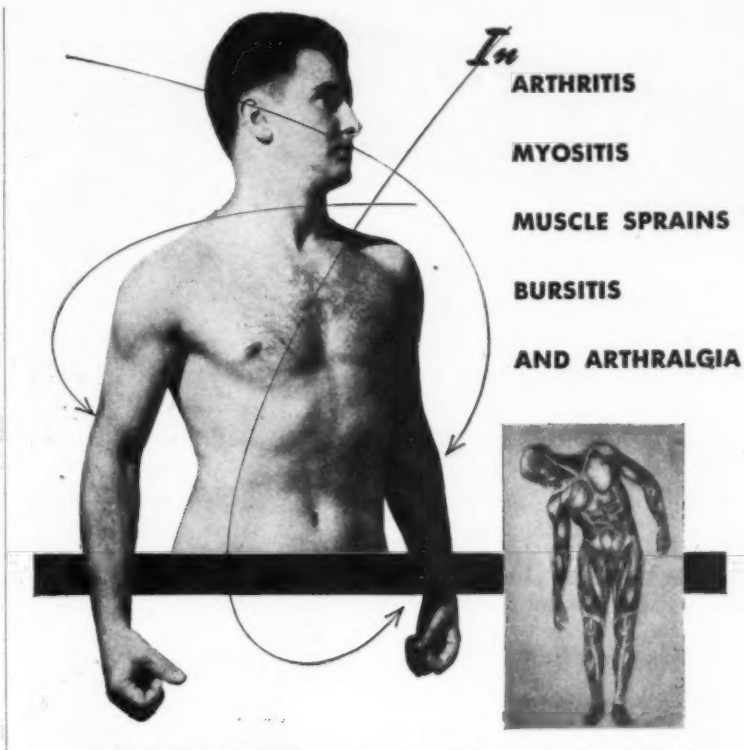
Radiology:
Each hospital to have at least one radiographic room with toilet, adjoining dark room and film filing space.
The radiology department must be convenient to in- and out-patients and shall have lead protection as required.

Physical therapy: Space should be provided for electrotherapy, massage, hydroptherapy, and exercise.

Pharmacy: Drug room with minimum facilities for compounding. Complete pharmacy may include space for manufacturing and solution preparation depending on policy of hospital. Must be convenient to Out-Patient Department.

Service rooms required:
Patients' waiting room.
Toilets.
Nurses' office.
Eye, ear, nose and throat room.
2 chair dental unit.
Utility room.
Doctors' office.
Treatment room also used as emergency operating room.
Record room.
Nurses' and staff locker space.
Examination cubicles.

Out-patient department:[1]
If out-patient department is added, in addition to above named service rooms the following space will be required:
Out-patient waiting room with toilets.
Admission office.
Medical social service office.
Information and cashier space.
Out-patient department should be located on the most easily accessible floor with an entrance separate from the main entrance to the hospital. It must be convenient to radiology, pharmacy, laboratory, and physical therapy.



OBJECTIVE IMPROVEMENT may be achieved through the beneficial influences exerted on the pathologic processes by the active hyperemia induced by a Baume Bengué massage.

SUBJECTIVE IMPROVEMENT is evidenced by a comforting sensation of warmth and relief of pain which may result from the combined local and systemic effects of Baume Bengué.

Percutaneous absorption of methyl salicylate not only reinforces the topical effects of Baume Bengué but can enhance other systemic measures used to combat the underlying disease processes. The proof of the systemic effects of such preparations was established by the fundamental work of Moncorps, Kionka, Hanzlik, Brown and Scott.

Baume Bengué
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Baume Bengué provides 19.7% *methyl salicylate,* 14.4% *menthol in a specially prepared lanolin base.*

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The size will vary in different locations and is not necessarily proportional to the size of the hospital. The patient load must be estimated to determine the number of rooms required.

Nursing Department

General: No room shall have more than 6 beds and not more than 3 beds deep from outside wall. Each room shall have a lavatory. Each nursing unit shall have a quiet room.

Size of nursing unit: 40 to 50 beds.

Minimum room areas:
125 square feet in single rooms.
96 square feet per person in larger rooms.

Service rooms in each nursing unit:
Nurses' station.
Utility room.
Floor pantry.
Toilet room for each sex.
Bed pan facilities.
Day room.
Wheel chair parking area.
Treatment room, one for each 2 nursing units a floor.
One bath room.
Stretcher alcove.
Linen closet.
Supply closet.
Janitors' closet.
Solarium: One for each nursing floor.
Nurses' toilet: One for each nursing floor.

Service Department

Dietary facilities:
Main kitchen and bakery.
Special diet kitchen.
Dietitians' office.
Dishwasing room (enclosed).
Adequate refrigeration.
Garbage refrigerator.
Can washing facilities.
Day storage room.
Personnel dining space: Provide 12 square feet per person. May be designed for 2 sittings, cafeteria, or table service optional.

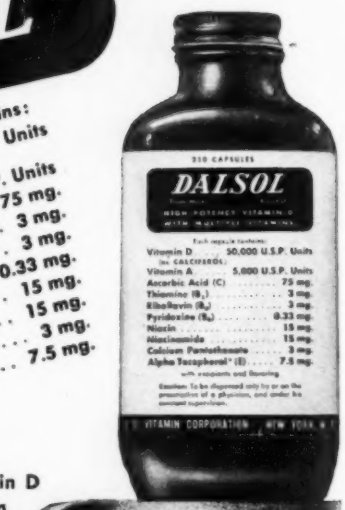
Housekeeping facilities:
Laundry:
Sorting area.
Processing area.
Clean linen and sewing room separate from laundry.

DALSOL

(U. S. VITAMIN)

Each DALSOL Capsule contains:

Vitamin D (as CALCIFEROL)	50,000 U.S.P. Units
Vitamin A	5,000 U.S.P. Units
Ascorbic Acid (C)	75 mg.
Thiamine (B_1)	3 mg.
Riboflavin (B_2)	3 mg.
Pyridoxine (B_6)	0.33 mg.
Niacin	15 mg.
Niacinamide	15 mg.
Calcium Pantothenate	3 mg.
Alpha Tocopherol (E)	7.5 mg.



Combining intensive dosage of Vitamin D (Calciferol) with high potency multivitamin therapy, DALSOL presents an important adjunct to the optimal nutrition so essential to the arthritic's welfare. DALSOL can help to

1. **meet higher-than-normal vitamin needs,**
2. **provide the therapeutic effects which may reside in the vitamins,**
3. **reduce deficiency vulnerability of affected joints,**
4. **counter gastro-intestinal dysfunction, fatigue, weight loss, nervousness, anemia, if and to the extent that such symptoms are due to avitaminoses.**

Multi-Nutritional Support as Adjunct Therapy in ARTHRITIS

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Provision of laundry facilities in hospital will depend upon hospital policy and availability of commercial laundry.
If laundry is provided, capacities shall be adequate to process full 7 days' laundry in work week.
Housekeeper's office: Located adjacent to laundry, or if no laundry is provided near central linen supply.

Mechanical facilities:
Boiler and pump room.
Engineers' office.
Maintenance shops.
Shower and locker facilities.
In hospitals up to and including 100 beds at least one room shall be provided. In larger hospitals separation of carpentry, painting and plumbing should be provided.
For minimum requirements for mechanical and electrical work see the respective sections.

Employees' facilities:
Nurses' locker room without Nurses' home: Locker room with locker for each 4 hospital beds.
Rest room.
Toilet and shower room.
Female help lockers:
Locker room.
Rest room.
Toilet and shower room.
Male help lockers:
Locker room.
Toilet and shower room.
Ratio of male and female help will vary and size of locker rooms must be adjusted accordingly.

Storage:
Inactive record storage.
Patients' clothes storage room.
General storage: 20 square feet per bed and to be concentrated in one area.

Ambulant Patient Section

General: Centrally located facilities connected to Intensive Nursing Section, capable of operating jointly, or each of them, detached, providing the best possible flexibility and future extension.

Dining hall: Provide minimum of 16 square feet per person. May be designed for two sittings. Table service, with food prepared in main kitchen of intensive nursing section.

Canteen.

Auditorium:
Seating capacity capable of seating entire ambulant population of institution.
Ample space for wheel chairs.
Arrangement for religious services.
Wash rooms and toilets.
Projection facilities.

Beauty parlor and barber shop.

Occupational therapy:
Office space for the occupational therapist.
One exhibition space.
Space 50-60 feet long divided for diversified occupational therapy work.

Recreational therapy:
Office space for the recreational therapist.
Class room or rooms.
Social room or rooms to be at the disposal and use of patients.
Patients' library facilities.

Bedroom unit:
Room:
Size 300 square feet (for 2 patients).
Closet for each person.
Lavatory in each room.

Common facilities:
Toilet and washroom:
Water closets—1 to each 5 patients.
Lavatories—1 to each 5 patients.
Dental Basins—1 to each 8 patients.
Bath tub or shower—1 to each 8 patients.
Janitors' closet each unit.
Linen closet each unit.
Supervisors' room each unit.
Living room and visitors' lounge.
Solarium.
Telephone booths.
Nurses' call system.

General facilities:
Employees' toilet and locker room.
Storage—reserve equipment.
Storage for patients' personal belongings.
(B-6). *Nurses' home.*

Rooms:
One nurse per room:[1]
120 square feet in single rooms.
150 square feet in double rooms.
Lavatory in each room.
Closet for each nurse.

Common floor facilities:
Lounge with kitchenette to serve approximately each 30 students.
Laundry room with two trays and two ironing boards to serve approximately each 30 students.
Bath room: One shower or tub for each 6 beds.
Toilet room: One water closet for each 6 beds and one lavatory for each 12 beds.
Linen closet.
Janitors' closet.
Telephone facilities.[1]

General facilities:
Lobby.
Office.
Main lounge with alcoves.
Men's toilet (off lobby).
Storage room for trunks.
General storage room.
Laundry distribution room.
Employees' toilet room.
Boiler room (if facilities not available elsewhere).
(B-7). *School of Nursing.*

Teaching facilities:
One science laboratory room.
One dietetics laboratory room.
One nursing arts laboratory with adequate facilities (laboratories to provide facilities for not more than 20 and not less than 12 students).
One classroom to accommodate approximately twice the number of students as a laboratory.
One lecture room to accommodate total student body.
One library.

Offices: Offices for instructors.

General:
Storage room convenient to classrooms.
Toilet room.
Janitors' closet.
(B-8). *Public Health Centers.*

[1] Desirable but not mandatory.

Administration:
Where health department administration personnel has no offices in health center:
Waiting room.
Public toilets.
Office for public health nurses.
Staff toilets.
Assembly space: Waiting room may be used for this purpose where health centers serve under 30,000 population.
Where health department administration offices are provided in health centers add:
Health officer's office.
Office for sanitary engineers.
Health education office.
Staff room and library: In health center for over 30,000 population.

Clinical: The clinical services, and extent of such services, provided in the health center will depend on the program contemplated by the health department to take care adequately of the particular needs of the population served by the health center.
For populations up to 30,000:
Two examination rooms for maternal and child health, V. D. and TB clinics.
Consultation room.
Utility room.
Dental room.
For population over 30,000, if the following services are provided, they shall include areas noted as follows:
Maternal and child health:
Demonstration room.
Examining room.
Toilet.
Tuberculosis and X-ray:
X-ray room with dressing booths.
Dark room.
Consultation and viewing room.
Venereal disease:
Examination room.
Treatment room.
Consultation room.
Toilet.
Dental:
2 Dental chairs.
Small dental laboratory.
Pharmacy: Dispensing room.

Laboratory:
The volume and type of laboratory tests in the health center will vary with local conditions and will determine the size of the laboratory. Such factors as density of population, area to be served, type of center (municipal, county, or rural), its use as a branch of the State Laboratory and availability of other laboratory facilities must be considered.

One room is required for urinalysis, hematology, and dark field examinations for syphilis and storage of biologicals furnished by the State Health Department.
Where food control, sanitation and communicable disease work is contemplated another room shall be furnished for this purpose.

Service:
General storage areas:
Bulk office and janitors' supplies.
Bulk clinical supplies.
Educational material.
Storage closets:
Office supplies.
Medical supplies.
Educational material.
Janitors' closet: Centrally located.
Heating plant.
(B-9). *State Public Health Laboratory.*

Administration department:
Director's office.
Secretary's office.
Assistant Director's office.
Information desk and switchboard.
Clerical office.
Office supply room.
Library.
Staff meeting room.
Records and filing room.
Mailing and receiving room for incoming specimens, distribution of containers and of biologicals.
Specimen and emergency treatment room.

Bacteriology department:
Office.
Water, food and milk laboratory.
Enteric disease and agglutination laboratory.
Tuberculosis laboratory.
Diagnostic laboratory.
Incubator room.
Sterile room.
Rabies room.
Adequate refrigeration.

Syphilis serology department:
Office.
Laboratory: Section of room separated by partitions for centrifuges and preparation of specimens.

Chemistry department:
Office.
Laboratory: Facilities for water, food, drug, toxicology, and/or industrial hygiene analyses.
Instrument room: Facilities for darkening.

Research and investigation:
Laboratory: Complete laboratory facilities within unit.

Biologicals department:
Adequate refrigeration.
Deep freeze unit.
Room temperature storage.

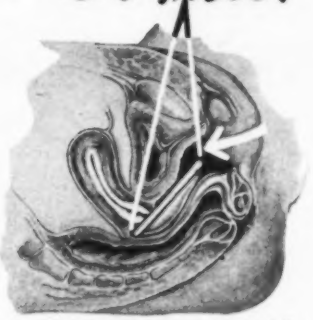
Central services:
Culture media and reagent preparation room.
Glassware cleaning room: Separate sterilizing facilities for contaminated materials.
Acid cleaning unit.
Sterilizing room for culture media and clean glassware only.
Supply room for storage and issue of sterile supplies, general supplies, chemicals, and glassware. Adjacent to sterilizing and glassware cleaning room.
Bulk storage room.
Janitor service room.
Maintenance and utilities unit: Provisions for metal and woodwork, and glassblowing.
Incinerator (animal).
Animal quarters:
Animal rooms.
Room for cleaning and sterilizing cages. Preparation room for food and bedding.
Operating and animal inoculation room.

DOCTOR: Does the Diaphragm You Prescribe . . .

Do This?

Showing how ARC Diaphragm automatically arcs up into symphysis pubis and posterior fornix when in position.

Or This?



Conventional diaphragm—danger of displacement when pubic notch is not prominent enough to hold diaphragm in place.

The New **ARC** *Diaphragm*

FOR A BETTER SEAL OF THE CERVIX

BEFORE FLEXING

FLEXED—SIDE VIEW

FLEXED—END VIEW

Made to Fit Vaginal Contours

Because of its specially designed rim, the ARC Diaphragm automatically arcs up anteriorly and posteriorly upon insertion. The sides of the rim press upward, making a firm seal against the upper vaginal wall along the entire rim—eliminating danger of displacement during muscular action.

Because of its unique rim, the ARC can be fitted to both NORMAL and many ABNORMAL anatomies, including certain cases of cystocele, rectocele, retroversion, anteversion, and other conditions often encountered.

Intended for use with spermicidal creme or jelly, the ARC is available in sizes 55 to 95 mm.

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greater
HEMATINIC IMPETUS
with
NEO-FERINEX

because NEO-FERINEX* provides iron in its most rapidly utilized form; because NEO-FERINEX B Vitamins and Liver Concentrate help speed absorption of and potentiate its hematinic iron; because "deficiency of the B vitamins, along with iron . . . is probably the most prevalent today." (Am. J. Med. Sc. 205:141, 1943).

For Faster More Lasting Recovery in Secondary ANEMIAS

NEO-FERINEX capsules each contain:

Exsiccated Ferrous Sulfate	2 gr.
Liver Concentrate 1:20	3 gr.
Thiamine Hydrochloride	0.333 mg.
Riboflavin	0.333 mg.
Pyridoxine Hydrochloride	0.050 mg.
Calcium Pantothenate	0.175 mg.
Niacinamide	3.300 mg.

Plus other factors of the B complex as they occur in liver concentrate.

Samples? Literature? Just write for them

*Reg. U. S. Pat. Off.

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Facilities for personnel:
- Men's locker room with washroom and shower.
- Women's locker room with washroom and shower.
- Rest room.
- Lunch room.
- Staff toilets.

State public health laboratory. If the following activities are included, minimum requirements will be as follows:

Consultation and evaluation service to local laboratories:
- Office.
- Laboratory.

Manufacture of biologicals:
- Office.
- Laboratory: Cubicles for isolation work.
- Culture media room.
- Sterile room.
- Sterilizing room.
- Glasswashing room.
- Adequate refrigeration.
- Deep freeze unit.
- Storage room, controlled temperature.
- Packaging room.

Blood and blood products:
- Laboratory: Space and equipment for processing.
- Sterile room.
- Office (may be shared with biologicals department).
- Adequate refrigeration (may be shared with biologicals department).
- Storage room (may be shared with biologicals department).

Pathology department: Laboratory.

Clinical laboratory department: Laboratory.

Virology department: This department shall be efficiently isolated from other laboratories including a separate mechanical ventilating system:
- Office.
- Laboratory: Cubicles for isolation work.
- Sterile room.
- Sterilizing room.
- Inoculation and operating room.

Animal quarters:
- Facilities for storage of food and bedding.
- Cleaning and sterilizing of cages.

Locker room with washroom and shower.

(B-10). *Details, finishes, etc.* The following general requirements and finishes apply to all hospitals. Conditions in special hospitals, not covered in the general requirements, are specifically noted.

General Requirements for Hospitals

Door widths:
- 3 feet 10 inches at all: Bed rooms.
  - Treatment rooms.
  - Operating rooms.
  - X-ray therapy rooms.
  - Delivery rooms.
  - Solariums.
  - X-ray rooms.
  - Physical therapy rooms.
  - Labor rooms.
- 5 feet at all: Fracture rooms.

No doors shall swing into the corridor except closet doors.[4]

Corridor widths: 7 feet, 6 inches, (8 feet preferred). A greater width shall be provided at elevator entrances.

Stair widths: Clear width between rails—3 feet, 8 inches.

Elevators: Platform size—5 feet 4 inches x 8 feet. Door opening—3 feet 10 inches. See also mechanical section.

Laundry chutes: Use optional. Where used 2'0" minimum diameter.

Incinerators: Use optional. See also mechanical section.

Nurses' call system:[4] Call station between each two beds in two-bed rooms and four-bed rooms and one in each one-bed room:
- Corridor dome light over each nursing room.
- Dome light and buzzer at nurses' station, utility room and floor pantry.

Fire protection: Exits, exit lights, fire towers, construction equipment, etc., shall conform to local and State Codes and the National Board of Fire Underwriters.

Mechanical ventilation: See mechanical section for details.

Chronic Disease Hospitals

Space allowances should be more generous than in other types of hospitals to allow for wheelchair traffic in such areas as dining rooms, recreation rooms, porches and toilets.

Corridors shall be 10 feet wide with handrails on both sides.

Allow wheelchair storage area in infirmaries at the rate of one wheelchair for each two patients.

Water closet enclosures to have handrails on both sides.

Urinals to have vertical bars on each side.

Lavatories to be supported on brackets to allow wheelchairs to slide under.

Raised thresholds at doorways shall be omitted.

Mental Hospitals, Psychiatric Hospitals and Mental Units in General Hospitals

The principles of psychiatric security and safety shall be followed throughout. Materials and details of construction shall be such that patients will not be tempted to escape, suicide, hiding, etc. Care must be taken to avoid projecting sharp corners, exposed piping, heating elements, fixtures, hardware, etc.

Public Health Centers

Width of corridors shall be not less than 5'0". Greater width preferred.

Windows of examination and treatment rooms shall be glazed with obscure glass to insure privacy.

State Public Health Laboratories

Provide separate airconditioning or ventilation system for bacteriological and virus laboratories with ample supply and exhaust to function properly with closed windows.

Emergency showers shall be provided in chemical laboratories.

Each chemical laboratory room shall have a minimum of two exits.

All windows must be screened.

(B-11). *Finishes.*

Floors:
- The floors of the following areas shall have smooth, waterproof, surfaces which are wear resistant:
  - Toilets.
  - Baths.
  - Bedpan rooms.

[4] Does not apply to: mental hospitals, psychiatric hospitals or mental units in general hospitals.

Floor pantries.
Utility rooms.
Treatment rooms.
Sterilizing rooms.
Janitors' closets.

The floors of the following areas shall be smooth, easily cleaned and acid resistant:
Pharmacies.
Laboratories.

The floors of the following areas shall be waterproof, greaseproof, smooth and resistant to heavy wear:
Kitchens.
Butcher shops.
Food preparation.
Formula rooms.

The floors of the following areas shall have conductive flooring as approved by the National Board of Fire Underwriters:
Operating rooms.
Delivery rooms.
Anesthesia rooms.
Adjoining spaces.

The floors in the following areas shall have a smooth resilient surface which is easily cleaned: Patient rooms.

Walls:

The walls of the following areas shall have a smooth surface with painted or equal washable finish in light color. They shall be without cracks and, in conjunction with floors, shall be waterproof and free from cracks and spaces which may harbor ants and roaches: All rooms where food and drink are prepared, served or stored.

The walls of the following areas shall have waterproof painted, glazed or similar finishes to a point above the splash or spray line:
Kitchens.
Sculleries.
Utility rooms.
Baths.
Showers.
Dishwashing rooms.
Janitors' closets.
Sterilizing rooms.
Spaces with sinks.

The walls of the following areas shall have waterproof glazed, painted or similar surface which will withstand washing to a distance of not less than 5'0":
Operating rooms.
Delivery rooms.

Ceilings:

The ceilings of the following areas shall be painted with waterproof paint:
Operating rooms.
Delivery rooms.
All sculleries, kitchens and other rooms where food and drink are prepared.

The ceilings of the following areas shall be acoustically treated:
Corridors in patient areas.
Nurses' stations.
Labor rooms.
Utility rooms.
Floor pantries.

State Public Health Laboratory

Floors:

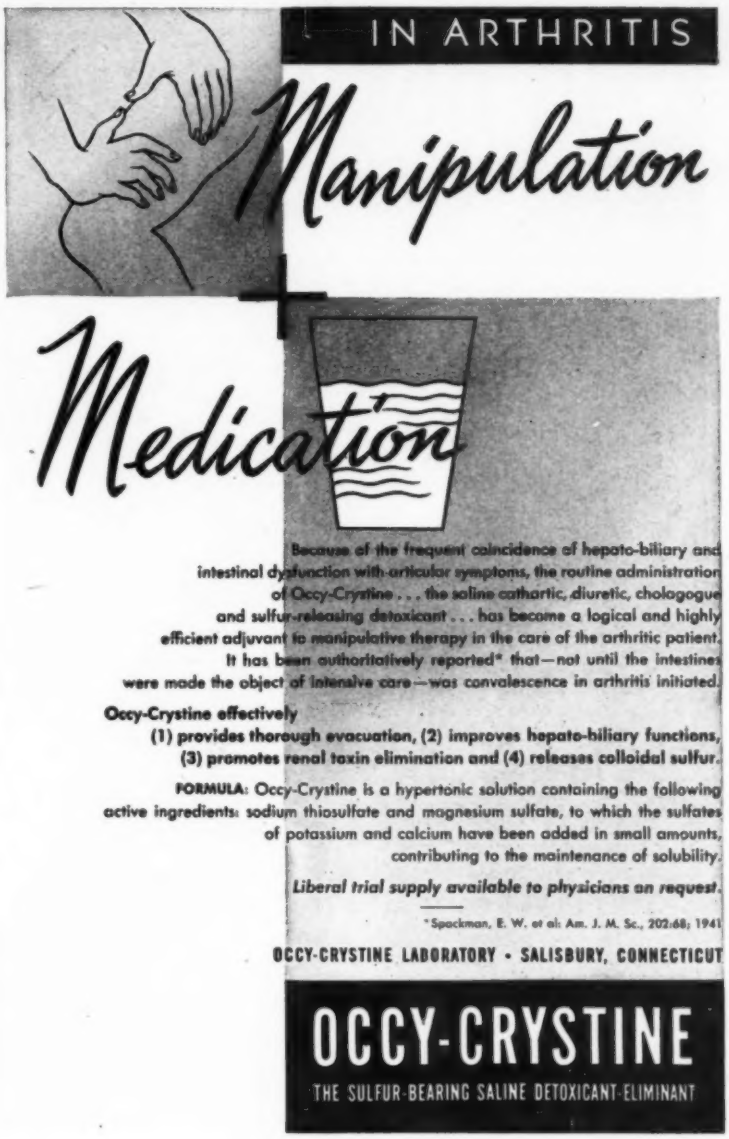
Resilient, smooth and stain resistant: All laboratories other than chemistry laboratories.

Resilient, smooth and acid resistant: Chemistry laboratories.

Smooth, waterproof, grease-proof, easily cleaned, non-slip, resistant to heavy traffic:
Culture media rooms.
Glasswashing rooms.
Sterilization rooms.
Acid cleaning rooms.
Animal rooms.

Walls:

Waterproof, painted, glazed or similar finishes to a point above the splash or spray line. They shall be without cracks, and in conjunction with floors, shall be waterproof and free of cracks and spaces which may harbor ants and roaches:
Laboratories.
Incubator rooms.
Sterilizing rooms.
Culture media rooms.
Glasswashing rooms.
Acid cleaning rooms.
Inoculation and operating rooms.
Animal rooms.


IN ARTHRITIS
Manipulation
+
Medication
Because of the frequent coincidence of hepato-biliary and intestinal dysfunction with articular symptoms, the routine administration of Occy-Crystine . . . the saline cathartic, diuretic, cholagogue and sulfur-releasing detoxicant . . . has become a logical and highly efficient adjuvant to manipulative therapy in the care of the arthritic patient. It has been authoritatively reported* that—not until the intestines were made the object of intensive care—was convalescence in arthritis initiated.
Occy-Crystine effectively
(1) provides thorough evacuation, (2) improves hepato-biliary functions, (3) promotes renal toxin elimination and (4) releases colloidal sulfur.
FORMULA: Occy-Crystine is a hypertonic solution containing the following active ingredients: sodium thiosulfate and magnesium sulfate, to which the sulfates of potassium and calcium have been added in small amounts, contributing to the maintenance of solubility.
Liberal trial supply available to physicians on request.
*Spackman, E. W. et al: Am. J. M. Sc., 202:68; 1941
OCCY-CRYSTINE LABORATORY • SALISBURY, CONNECTICUT
OCCY-CRYSTINE
THE SULFUR-BEARING SALINE DETOXICANT-ELIMINANT

Same as above, but finish to reach to ceiling: Sterile rooms.

Ceilings: Waterproof painted: Sterile rooms.

Shelves and cabinets: Shelves and cabinets which are used for the storage of food, dishes, and cooking utensils shall be so constructed and mounted that there shall be no openings or spaces which cannot be cleaned and which might harbor vermin or insects. Cabinets which are used for the storage of open food containers and dishes shall be dust tight.

III-C. *Structural*—A. *Codes.* All construction shall be in accordance with the applicable local and State building codes and regulations. In areas which are not subject to local or State building codes, the recommendations of the following nationally recognized technical and engineering authorities shall be adopted insofar as such recommendations are not in conflict with the minimum general standards as set forth herein.

1. *American Concrete Institute.* (a) For good engineering practice in the design, erection, allowable working stresses, and for the mixing and placing of concrete on structures built of reinforced concrete.

(b) For standard specifications for cast stone.

2. *American Standards Association.* (a) For standard practice in masonry construction.

(b) For the design and erection of structural steel for buildings (the American Institute of Steel Construction Code).

(c) For good practice in gypsum plastering, including requirements for lathing and furring. erection of reinforced gypsum concrete.

(d) For good practice in the design and erection of reinforced gypsum concrete.

(e) For safe practice in the design and construction of elevators and dumbwaiters.

3. *American Society of Testing Materials.* (a) For the specifications on, and the methods of testing, for metals and the materials of masonry construction.

(b) For the methods of standard fire tests of building construction and materials and for the methods of fire tests of door assemblies.

4. *National Lumber Manufacturers' Association.* (a) For good practice in the use of wood in types of construction of which it is a part, and for the working stresses of stress-grade lumber and its fastenings.

In Bursitis
In the management of bursitis,
NUMOTIZINE
exerts a three-fold effect. It supplies the indicated moist heat; the contained medicaments favor decongestion—relieve pain. One application lasts 8 to 12 hours.
NUMOTIZINE, INC.
900 N. FRANKLIN ST.
CHICAGO, ILLINOIS

5. *National Board of Fire Underwriters.* (a) For estimated and tested fire-resistance ratings of materials and constructions.

(b) For safe practice in the design and construction of chimneys and metal smoke stacks.

6. *National Bureau of Standards.* (a) Publication BMS 92 and other data for tested fire-resistive ratings of materials and constructions.

B. *Design data—General.* The buildings and all parts thereof shall be of sufficient strength to support all dead, live, and lateral loads without exceeding the working stresses permitted for the materials of their construction in generally accepted good engineering practice.

Special. Special provisions shall be made for machines or apparatus loads which would cause a greater load than the specified minimum live load.

Consideration shall be given to structural members and connections of structures which may be subject to hurricanes or tornadoes. Floor areas where partition locations are subject to change shall be designed to support, in addition to all other loads, a uniformly distributed load of 25 p. s. f.

Live loads. The following unit live loads shall be taken as the minimum distributed live loads for the occupancies listed:

Hospital wards and bedrooms, 40 p. s. f.

Corridors above second floor, solariums and miscellaneous service rooms, 60 p. s. f.

Offices, treatment rooms, operating rooms, conference rooms, toilet and locker rooms, laboratories, kitchens, 80 p. s. f.

Corridors on first and second floors, library, assembly, lounges and recreation, waiting room, dining, laundry, 100 p. s. f.

Records File room, storage, supply, 125 p. s. f.

Mechanical equipment room, 150 p. s. f.

Roofs (except use increased value where snow and ice may occur), 20 p. s. f.

Wind (as required by local conditions, but) not less than 15 p. s. f.

Earthquake—for structures located within an area subject to earthquake shocks, refer to "Uniform Building Code" of the Pacific Coast Building Officials Conference.

C. *Construction.* Foundations shall rest on natural solid ground and shall be carried to a depth of not less than one foot below the estimated frost line or shall rest on leveled rock or load-bearing piles when solid ground is not encountered. Footings, piers, and foundation walls shall be adequately protected against deterioration from the action of ground water. Reasonable care shall be taken to establish proper soil-bearing values for the soil at the building site. If the bearing capacity of a soil is not definitely known or is in question, a recognized load test may be used to determine the safe bearing value.

One-story buildings shall be constructed of not less than one-hour fire-resistive construction throughout except that boiler rooms, heating rooms, and combustible storage rooms shall be of three-hour fire-resistive construction.

Buildings more than one story in height shall be constructed of incombustible materials, using a structural framework of reinforced concrete or structural steel except that masonry walls and piers may be utilized for buildings up to three stories in height not accounting for Penthouses. The various elements of such buildings shall meet the following fire-resistive requirements:

Walls:	*Hours*
Party and firewalls	4
Exterior bearing walls	3
Exterior panel and curtain walls	3
Inner court walls	3
Bearing partitions	3
Non-load bearing partitions	1
Enclosures for stairs, elevators and other vertical openings	2
Columns, girders, beams, trusses	3
Floor panels (including beams and joists in same)	2
Roof panels (including beams and joists in same)	2

Stairs and platforms shall be reinforced concrete or structural steel with hard incombustible materials for the finish of risers and treads.

Rooms housing furnaces, boilers, combustible storage or other facilities which may provide fire hazards shall be constructed of 3-hour fire-resistive construction.

III D. *Mechanical—1. Heating; steam piping and ventilation—Codes.* The heating system, steam piping, boilers and ventilation shall be furnished and installed to meet all requirements of the local and State codes and regulations, and the regulations of the National Board of Fire Underwriters and the minimum general standards as set forth herein. Where there is no local or State boiler code, the recommendations of the A. S. M. E. shall apply. Gas fired equipment shall comply with the regulations of the American Gas Association.

Boilers. Boilers shall have the necessary capacity when operating at normal rating to supply the heating system, hot water, and steam operated equipment, such as sterilizers, laundry and kitchen equipment. Spare boiler capacity shall also be provided in a separate unit to replace any boiler which might break down. Boilers which supply high pressure steam to sterilizers, kitchens, laundry, etc., shall meet the requirements of the city and State boiler codes for 125 pounds working pressure. Boilers for laundries shall be operated at not less than 125 pounds pressure while boilers for sterilizers and kitchen may operate at 50 pounds pressure.

Heating system. The building shall be heated by a hot water, steam, or equal type heating system.

Steam system. A system of Steam and Return Mains and Connections shall be provided to supply all equipment which requires steam heat.

Boiler accessories. Boiler feed pumps, return pumps and circulating pumps shall be furnished in duplicate, with feeder water heater, each of which has a capacity to carry the full load. Blow off valves, relief valves, non-return valves and fittings shall be provided to meet the requirements of the City and State Codes.

Radiation. The necessary radiation shall be furnished in each room and occupied space to maintain a temperature of 70° F. except in operating, delivery, and nurseries where a temperature of 75° F. shall be maintained. Each radiator shall be provided with hand control valve.

Piping. Steam and hot water heating piping shall be installed with standard weight

steel or iron pipe and cast iron fittings. Pipe used in heating and steam systems shall not be smaller sizes than prescribed by the latest edition of the Heating, Ventilating and Air Conditioning Guide. The ends of all steam mains and low points in steam mains shall be dripped.

Valves. Steam, return and heating risers, steam return, and heating mains shall be controlled separately by a valve. Each steam and return main shall be valved. Each piece of equipment supplied with steam shall be valved on the supply and return ends.

Thermostatic control. The heating system shall be thermostatically controlled in one or more zones.

Auxiliary heat. Auxiliary radiators shall be provided in operating rooms, delivery rooms, and nurseries to supply heat when the main heating system is not in operation.

Coverings. Boilers and smoke breeching shall be insulated with covering not less than 1" Magnesia blocks and ½" plastic asbestos finish. All high pressure steam and high pressure return piping shall be insulated with covering not less than the equivalent of 1" four ply asbestos covering. Heating mains in the boiler room, in excavated spaces, unexcavated spaces, and where concealed, shall be insulated with covering not less than 1" asbestos air cell.

Ventilation. Rooms which do not have outside windows and which are used by hospital personnel, such as Utility rooms, Toilets, Bed pan rooms, and Baths, and Sterilizer rooms, shall be provided with forced or suitable ventilation to change the air at least once every six minutes.

Kitchens, morgues and laundries which are located inside the hospital building shall be ventilated by exhaust systems which will discharge the air above the main roof or 50' 0" from any window. The ventilation of these spaces shall comply with the State or Local Codes but if no code governs, the air in the work spaces shall be exhausted at least once every six minutes with the greater part of the air being taken from the flat work ironer and ranges. Rooms used for the storage of inflammable material shall be ventilated to the outside air with intake and discharge ducts.

The operating and delivery rooms shall be provided with a supply ventilating system with heaters and humidifiers which will change the air at least eight times per hour by supplying fresh filtered air humidified to prevent static. No recirculation will be permitted. The air shall be removed from these rooms by forced system of exhaust. The sterilizing rooms adjoining these rooms shall be furnished with separate exhaust ventilating systems.

Incinerator. If coal fixed boilers are not used incinerators shall be provided. If provided, the incinerator shall be of a design that will completely burn 50% wet garbage without objectionable smoke or odor. It shall be designed with drying hearth, grates and combustion chamber lined with 9" fire brick. The gases shall be carried to a point above the roof of the hospital.

Tests. The systems shall be tested to demonstrate to the satisfaction of the State agencies having jurisdiction that: The boilers will carry the full load with one boiler in reserve, that the steam supply to all steam heated equipment is ample, that the ventilating equipment meets the minimum requirements and that all systems circulated satisfactorily without leaks or noise.

Health centers, nurses homes and laboratories. High pressure steam and a spare boiler, will not be required for a Health Center, Nurses Homes, and Laboratory building. Incinerators are not mandatory but are recommended in Health Centers, Laboratories and Nurses Homes.

Separate special ventilation or air-conditioning systems are required for the bacteriological and virus laboratories.

Mental hospitals. Radiators, grilles, pipes, valves and equipment shall be so located that they are not accessible to patients. Hot air heating may be used for spaces occupied by mental cases.

2. *Plumbing and drainage.* All parts of the plumbing systems shall comply with all applicable local and State codes and the requirements

AIR is *not* free...

During dyspnea attending asthma and bronchitis, ***air is not free***—every breath is bought at the price of exhausting effort on the part of your patient.

Relieve paroxysmal respiratory distress with the oral administration of prompt, *convenient* FELSOL.

Also recommended for the symptoms commonly associated with hay fever, and for neuralgic headache.

FELSOL contains antipyrine, iodopyrine, citrated caffeine, and lobeline sulphate. Available in boxes containing 15 and 90 one-gram powders.

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MANY DOCTORS PREFER A NATURAL LAXATIVE like

L-M WHEY

NON IRRITATING—NON HABITUATING

Taken on arising in a tall glass of warm liquid it tends to act as a hydrogugne eliminant. Repeated daily doses change the intestinal flora by encouraging colonic acidophilus.

L-M WHEY is a pleasant powder derived from the plasma portion of buttermilk. Supplied plain in $1.50 and $2.50 Canisters (retail) or is also available as a WHEY-PLUS-BULK combination under the name of NEUTRA-BLAND in tall $2.50 size Cans retail.

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L-M WHEY is not marketed through stores. It is sold for DISPENSING USE ONLY.

Trial orders or request for samples solicited.

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REDUCING DIETS

If Patients Do Not Cooperate?

Restricted diets to an extent are restricted not only in calories but in volume. Big eaters have to have their G. I. tube filled either with food or space filling vegetable fibers or both—otherwise, the patients feel, as they put it, "all gone empty," and they are off diets. Many doctors who dispense a box of NEUTRA-BLAND to aid reducing regimes find *three remarkably gratifying results.*

1. The Hydrophilic vegetable fibers in NEUTRA-BLAND expand into a valume of 'gel'—filling stomach space with extra bulk without extra calories.

2. The demulcent fibers also speed elimination of food residues . . . so often needed in reducing diets, especially to relieve a cause of that "tight feeling gas distension."

3. NEUTRA-BLAND also contains a mild antacid (magnesium trisilicate) to relieve their pseudo hunger caused by that "before-meal" hyperacidity.

NEUTRA-BLAND to aid restricted diets with "bulk" should be used 15 minutes before meals. When used simply as a bulk laxative it should be administered after meals, or any time.

Supplied 14 oz. Tall Can.....$2.50 (retail)

Supplied for Dispensing Only—None Sold to Stores or the Public.

Samples or Trial Orders on Request.

Neutra Bland

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DETROIT 6, MICH.

of the State Department of Health and the minimum general standards as set forth herein. Where no State or local codes are in force or where such codes do not cover special hospital equipment, appliances, and water piping, the National Bureau of Standards Plumbing Manual BMS 66 shall apply.

Water service. The water supply available for the hospital shall be tested and approved by the State Department of Health.

The water service shall be brought into the building to comply with the requirements of the local water department and shall be free of cross connections.

Hot water heaters and tanks. The hot water heating and storage equipment shall have sufficient capacity to supply 5 gallons of water at 150° F. per hour per bed for hospital fixtures, and 8 gallons at 180° F. per hour per bed for the laundry and kitchen.

The hot water storage tank or tanks shall have a capacity equal to 80% of the heater capacity.

Where direct fired hot water heaters are used they shall be of an approved high pressure cast iron type. Submerged steam heating coils shall be of copper. Storage tanks shall be of non-corrosive metal or be lined with non-corrosive material to comply with the A. S. M. E. Code for pressure vessels. Tanks and heaters shall be fitted with vacuum and relief valves, and where the water is heated by coal or gas they shall have thermostatic relief valves. Heaters shall be thermostatically controlled.

Water supply systems. From the cold water service and hot water tanks, cold water and hot water mains and branches shall be run to supply all plumbing fixtures and equipment which require hot or cold water or both for their operation. Pipes shall be sized to supply water to all fixtures with a minimum pressure of 15 pounds at the top floor fixtures during maximum demand periods. All plumbing fixtures except water closets, bed pan washers and drinking fountains shall have both hot and cold water supplies. Every supply outlet or connection to a fixture or appliance shall be protected against back flow in accordance with the provisions of standards for air gaps and back-flow preventors as provided by plumbing Standards ASA-40.4 and 40.6. Wherever the usage of fixture or appliance will permit, water supplied to all fixtures, open tanks and equipment, shall be introduced through a suitable air gap between the water supply and the flood level of the fixture. No connections shall be made which will permit back-flow.

Hot water circulating mains and risers shall be run from the hot water storage tank to a point directly below the highest fixture at the end of each branch main. Where the building is higher than 3 stories, each riser shall be circulated. Water pipe sizes shall be equal to those prescribed by the National Bureau of Standards Report BMS 66.

(Continued in May issue)

What's New with Advertisers

HOSPITAL CHEST SURVEY UNIT

A new hospital chest survey apparatus has recently been announced by North American Philips Company, Inc., 100 East 42nd Street, New York. This unit is the first of its kind specifically designed for hospital use and satisfactorily accommodates either ambulant or stretcher patients.

The new Philips apparatus utilizes 70 mm. roll film, single or double exposure cut film miniatures, or 14 by 17 inch full size radiographic film. The camera is motor-driven and holds 100 feet of 70 mm. imperforated film—enough for 375 images 2½ by 3 inches each.

The unit can be operated from any existing x-ray generator simply by coupling to the HCS controller. Very little space is required by the novel wall-mounted design and this is important where hospital admitting departments are small.

With finger-tip ease, the hood, camera and tube assembly swings on a horizontal axis to accommondate patients in either standing or prone positions almost instantaneously, a specially constructed stretcher is used for nonambulant cases.

The need for routine chest x-rays of all incoming hospital patients has been apparent for some time. The Philips unit was designed for this purpose.

EPINEPHRINE HYDROCHLORIDE FOR INHALATION THERAPY NOW IN STABLE FORM

Azodrine (nebutabs and liquids) provides a bronchial antispasmodic in fresh solution whenever needed. It is easily and quickly prepared through a unique development by Premo Pharmaceutical Laboratories, Inc., 443 Broadway, New York 13.

Epinephrine hydrochloride has long been recognized as an unrivaled drug in the symptomatic treatment of bronchial asthma. Since epinephrine decomposes readily on exposure to air and light and is easily oxidized in neutral or alkaline solutions, there has arisen a wave of professional requests for a stable solution of epinephrine hydrochloride (1:100).

After more than 2 years of research and extensive laboratory tests, Premo Pharmaceutical Laboratories have answered these requests with azodrine nebutabs and liquid for oral inhalation.

Time does not affect azodrine—a fresh solution of epinephrine hydrochloride (1:100) is always available by simply dissolving a nebutab in a prepared diluent.

CLASSIFIED ADS

RATES PER INSERTION. $2.00 for 20 words or less. Additional words 10 cents each. 25c for box number.

FOR SALE: $14,000 yearly practice in Michigan industrial town, population 2,500. 10 room ground floor office building, newly remodeled, fully equipped, X-Ray, etc. One room rented to optometrist, room for dentist. Excellent hospital facilities (osteopathic). Reasonable terms if desired. H. R. MYERS, D.O., 311 E. Main St., Lowell, Michigan.

SPECIAL PRICES ON MAIL ORDERS. Complete X-Ray accessories, films, new and used diathermy, sine wave, quartz lamps, colonic equipment, examination and chrome office furniture, tube and pad replacements. Oster vibrator. EDMUND F. HANLEY, 1021 No. Grand, St. Louis 6, Missouri.

FOR SALE: 25 bed new modern clinic-hospital in central Texas county seat town of 5000. Averaging 220 majors a year. Gross $100,000.00 in 1946. Box 372, THE JOURNAL.

FOR SALE: Nearly new 1946 Model General Electric Portable X-Ray, Model F-4 Shockproof Unit. Immediate delivery. Dr. R. E. Harvey, 52½ Lincolnway, Valparaiso, Indiana.

WANTED: Radiologist. Certified preferred, but not imperative. Exceptional opportunity in Middle West for one interested in building for the future. Write full particulars with complete qualifications. Box 377. THE JOURNAL.

FOR SALE: Brand new Portable Short Wave Machine 300 watt, 10.98 meters, Black Leatherette Carrying Case—$142.50. C.O.D. Circular upon request. Stanmed Products Co., 111 East 23rd St., New York City.

YOUNG D.O. desires to buy acute practice, including home and office, in small New Jersey town. Prefer location near hospital. Box 471, THE JOURNAL.

FOR SALE: Well established Rhode Island practice with growing opportunity. Best osteopathic location in city. Modern apartment and office. Reasonable rent. Will introduce. Price is right. Write Box 472, THE JOURNAL.

FOR SALE: Excellently equipped office and practice in professional building in western city of 40,000. Practice established 12 years. Unusual opportunity. Leaving to specialize. Write Box 473, THE JOURNAL.

FOR SALE: Unusual opportunity to take over established general, obstetrical, surgical practice in modern eight-room clinic, located in prosperous small town in Michigan. Will sell for price of clinic building, low overhead, equipment optional, also sell new home if desired. Good hospital facilities. Specializing. Write Box 474, THE JOURNAL.

FOR SALE: H. G. Fischer Company Model "CK" cold quartz ultra violet lamp. Dual burner (germicidal and tanning rays) with orificial attachment and automatic timer. Less than four hours actual use—new condition $200.00. Dr. L. A. Nowlin, 317-320 Lane Building, Davenport, Iowa.

FOR SALE: Residence, practice and complete office equipment. New York State, suburb of New York City. Established over 40 years. Retiring. If interested in good location and lucrative practice, this is an opportunity. Some cash required. Box 475, THE JOURNAL.

FOR SALE: Brady Portex X-Ray unit 15 MA. at 75 K.V. with switch on transformer head to permit use of 5 MA. in fluoroscopic work, all mounted on counter-balanced adjustable standard, on rubbercasters. Best offer takes. J. H. Laird, Jr., D.O., 1113 Mott Foundation Bldg., Flint 3, Michigan.

HOW *Hydrocin* SERVES BOTH PATIENT AND DOCTOR

For Nearly Two Decades Accumulating Evidence Points to Renton's HYDROCIN Tablets as Desirable Therapy in Treating the Following:

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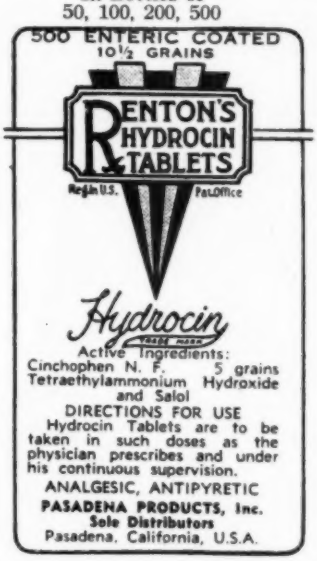
In Bottles of 50, 100, 200, 500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Hydrocin
Active Ingredients:
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Hydrocin Tablets are to be taken in such doses as the physician prescribes and under his continuous supervision.
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6. *Hydrocin:* is anti-pyretic.
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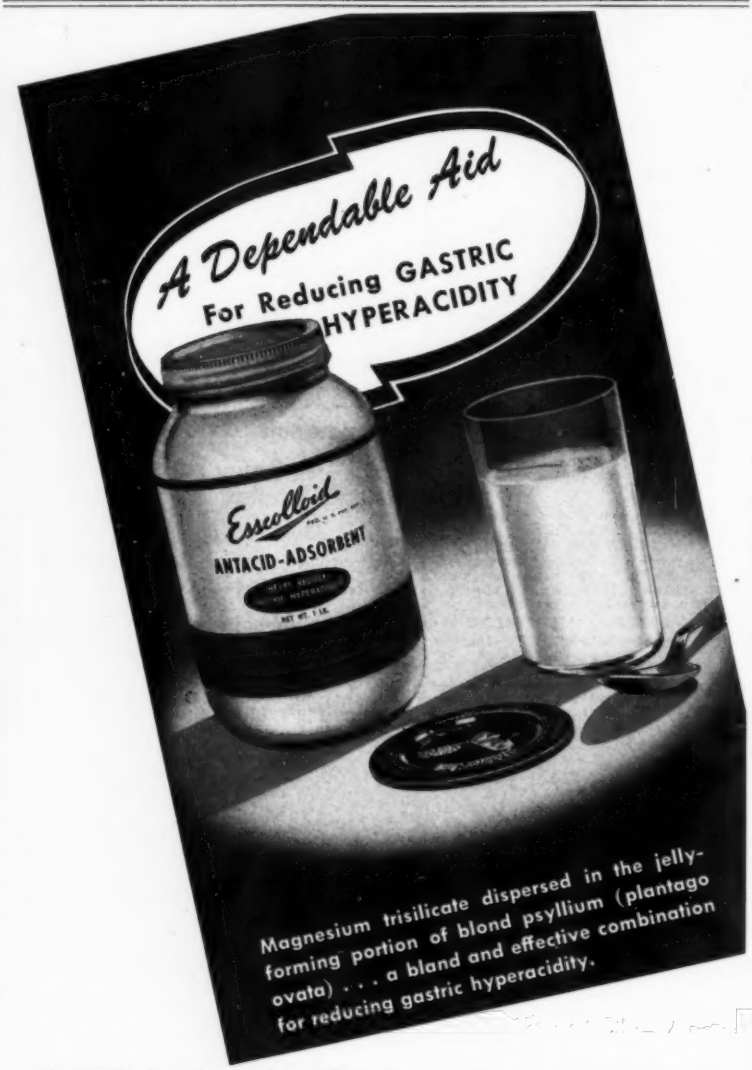
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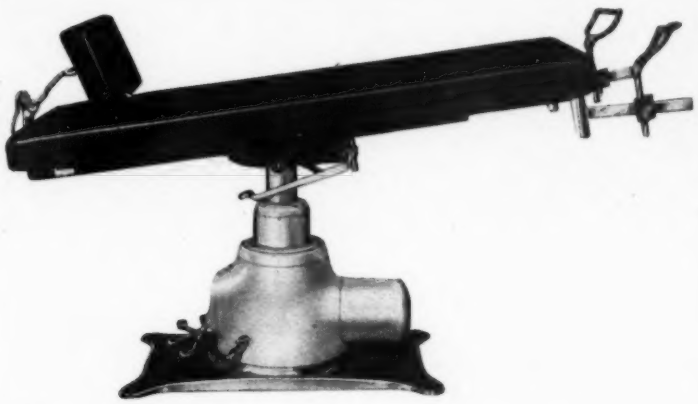

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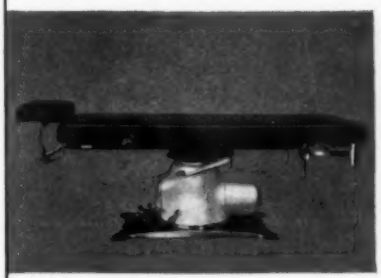

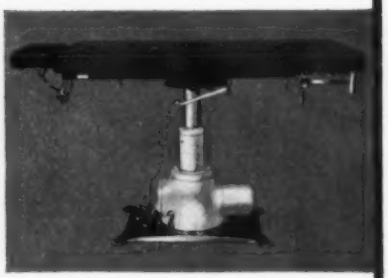

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PROFESSIONAL ADJUSTMENTS IN NURSING. By Eugenia Kennedy Spalding, R.N., M.A., Professor of Nursing Education, Indiana University, Bloomington, Indiana; Formerly Associate Professor, School of Nursing Education, The Catholic University of America, Washington, D. C.; Associate Director, Division of Nurse Education, U. S. Public Health Service, Washington, D. C. Ed. 3, revised and reset. Cloth. Pp. 509, with illustrations. Price $3.50. J. B. Lippincott Company, 227 S. Sixth St., Philadelphia, 1946.

FUNDAMENTALS OF CLINICAL NEUROLOGY. By H. Houston Merritt, M.D., Professor of Clinical Neurology, College of Physicians and Surgeons, Columbia University; Chief of Division of Neuropsychiatry, The Montefiore Hospital, Fred A. Mettler, M.D., Ph.D., Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University, and Tracy Jackson Putnam, M.D., Professor of Neurology and Neurological Surgery, College of Physicians and Surgeons, Columbia University. Cloth. Pp. 289, with illustrations. Price $6.00. The Blakiston Company, 1012 Walnut St., Philadelphia, 1947.

PRINCIPLES AND PRACTICE OF OBSTETRICS. By Joseph B. DeLee, M.D., Late Professor of Obstetrics and Gynecology, University of Chicago; Consultant in Obstetrics, Chicago Lying-in Hospital and Dispensary; and J. P. Greenhill, M.D., Attending Obstetrician and Gynecologist, Michael Reese Hospital; Obstetrician and Gynecologist, Associate Staff, Chicago Lying-in Hospital; Chairman Department of Gynecology, Cook County Hospital; Professor of Gynecology, Cook County Graduate School of Medicine. Ed. 9. Cloth. Pp. 1011, with illustrations. Price $10.00. W. B. Saunders Company, West Washington Square, Philadelphia, 1947.

ESSENTIALS OF ENDOCRINOLOGY. By Arthur Grollman, Ph.D., M.D., F.A.C.P., Professor of Medicine and Chairman of the Department of Experimental Medicine, Southwestern Medical College; Attending Physician and Consultant in Endocrinology, Parkland Hospital, Dallas, Texas. Ed. 2, revised and enlarged. Cloth. Pp. 644, with illustrations. Price $10.00. J. B. Lippincott Company, 227 S. Sixth St., Philadelphia, 1947.

PHYSICAL MEDICINE IN GENERAL PRACTICE. Edited by Arthur L. Watkins, M.D. Cloth. Pp. 341, with illustrations. Price $5.00. J. B. Lippincott Company, 227 S. Sixth St., Philadelphia, 1947.

MENTAL DISORDERS IN LATER LIFE. By Oscar J. Kaplan. Cloth. Pp. 436, with charts and illustrations. Price $5.00. Stanford University Press, Stanford University, California, 1945.

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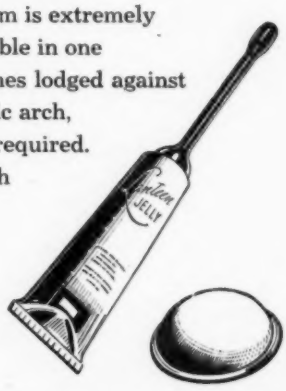

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